USDA United States Department of Agriculture
Natural Resources Conservation Service

# Colorado
# Water Supply Outlook Report
## January 1, 2019

**The Sneffels Range which form the northern front of the San Juan Mountains viewed from the Uncompahgre Plateau on Christmas Day 2018. While snowpack is still well below normal in the southwest corner of Colorado storms right after Christmas and over the New Year helped to improve the snowpack.**

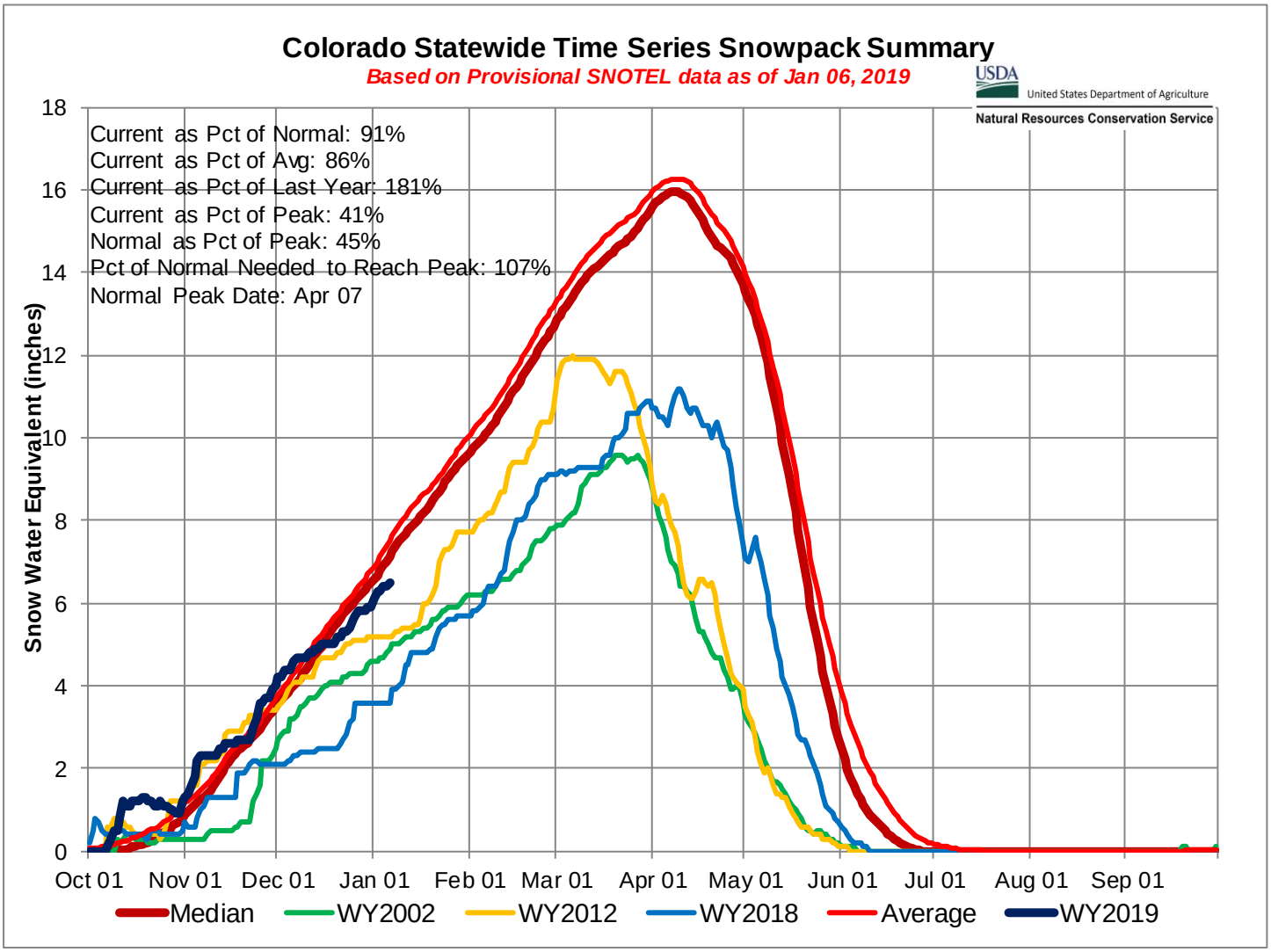
**Photo By: Karl Wetlaufer Date: December 25th, 2018**

**REMINDER:** We are soliciting field work photos from the field again this year. Each month we will pick one to grace the cover of this report! Please include information on where, when and of who/what the photo was taken.

# Contents

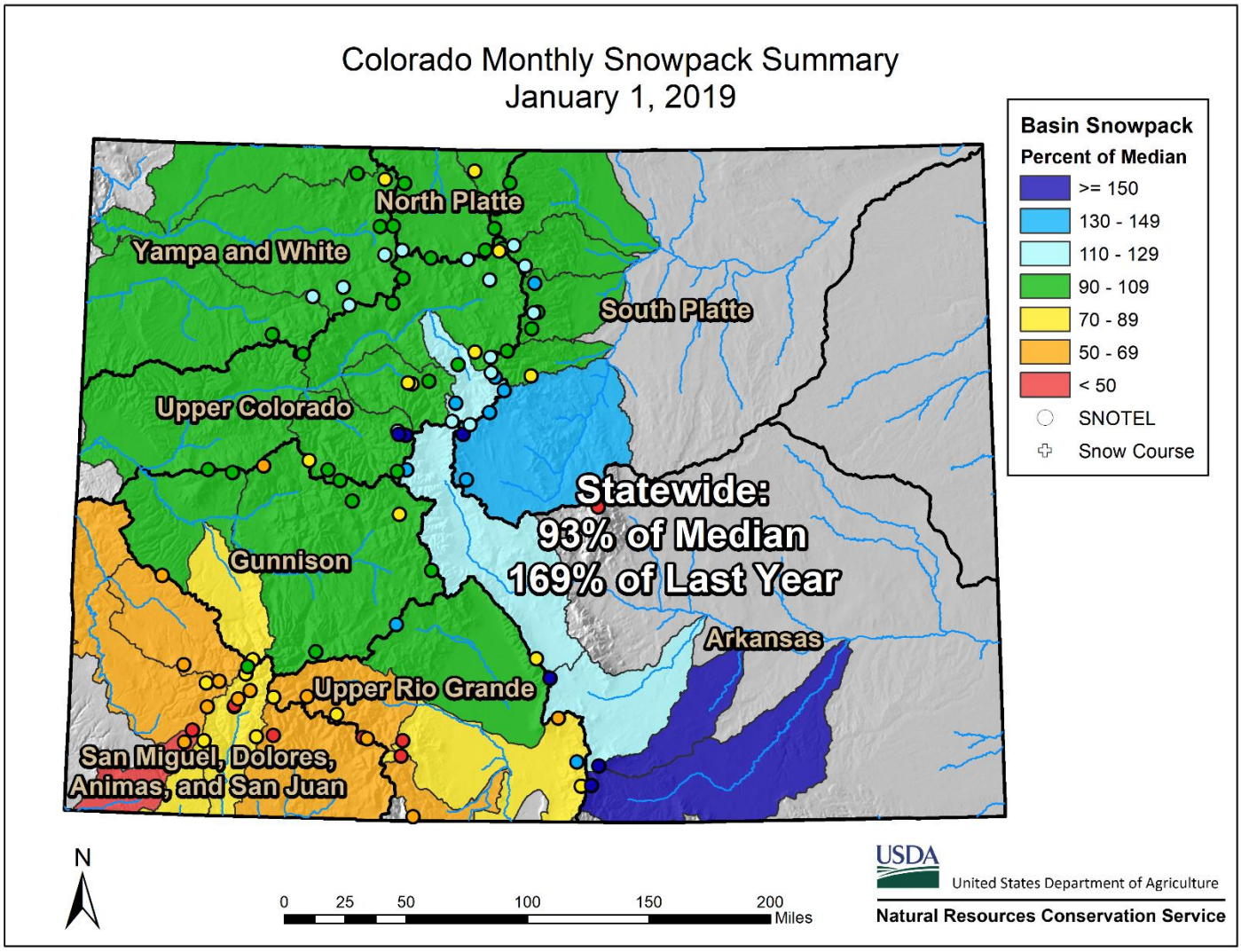
# Colorado Statewide Water Supply Conditions

## Summary



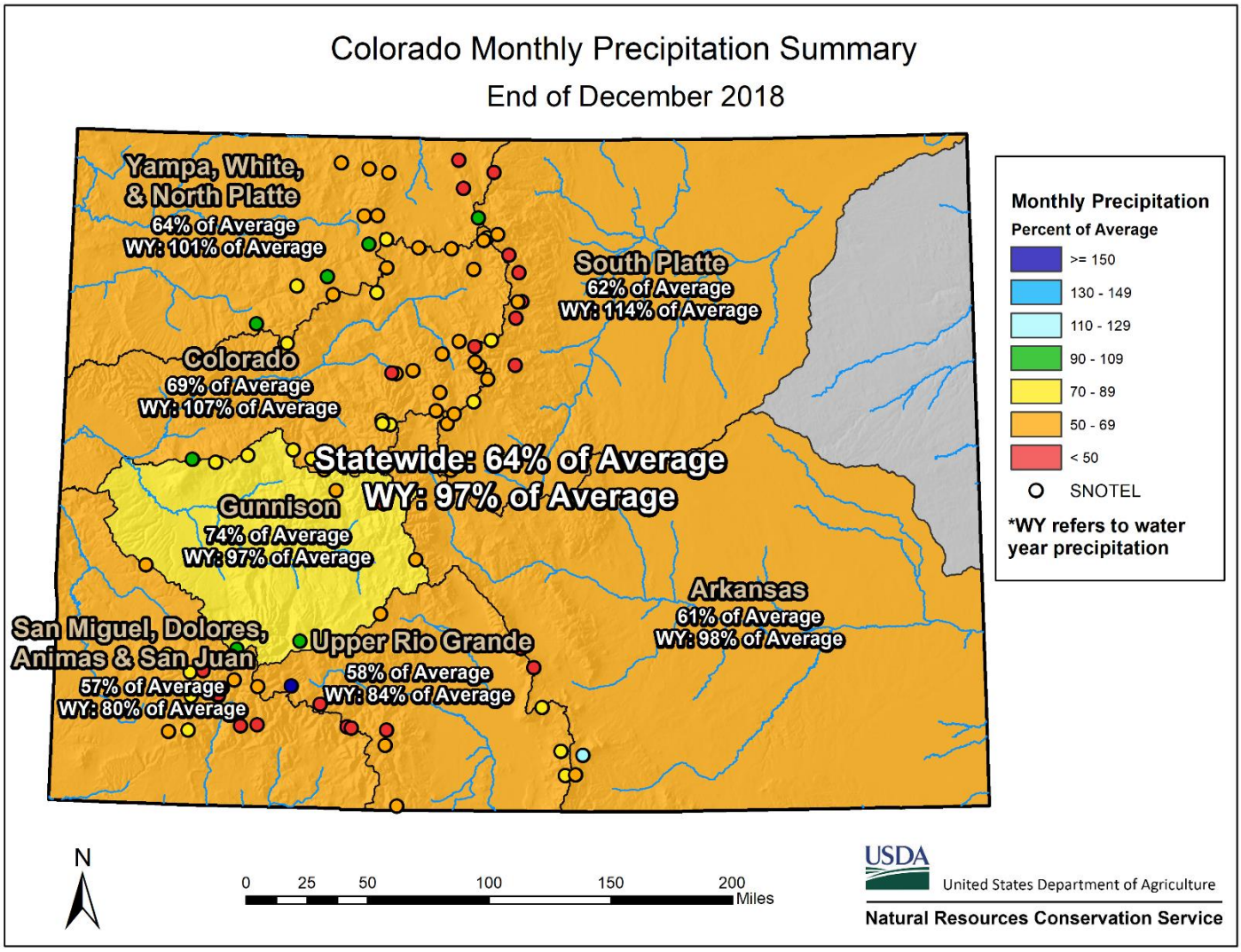

It has been an interesting start to water year 2019 so far across Colorado. While water year precipitation and snow accumulation have been dramatically better than last year on a statewide basis they are still not above average and the areas that were the driest last year are currently the most below normal. As of January 1st statewide water year precipitation was 97 percent of average. On the low end, the combined southwest basins of the San Miguel, Dolores, Animas, and San Juan have received 80 percent of normal. Conversely, the South Platte has received the highest percent of normal water year precipitation at 114 percent. Snowpack reflects similar trends across the state but at slightly lower levels than precipitation in most basins, relative to normal. Snowpack is at a high of 116 percent of normal in the Arkansas River basin and a low of 66 percent in the southwest basins. Reservoir storage also varies quite widely across the state but some large ones have been notably lacking. Blue Mesa, Colorado's largest reservoir, is experiencing one of its lowest volumes since the early 1980s and Ridgway Reservoir is the lowest since it first filled in the late 1980's. While there is still a lot of winter yet to come, it would be very beneficial for this pattern to change. This is particularly true in the southern parts of the state, where last year's extremely low stream flows led to depleted reservoir storage. A good snowpack this winter would be very beneficial to ensure ample water supply for summer 2019.

## Snowpack



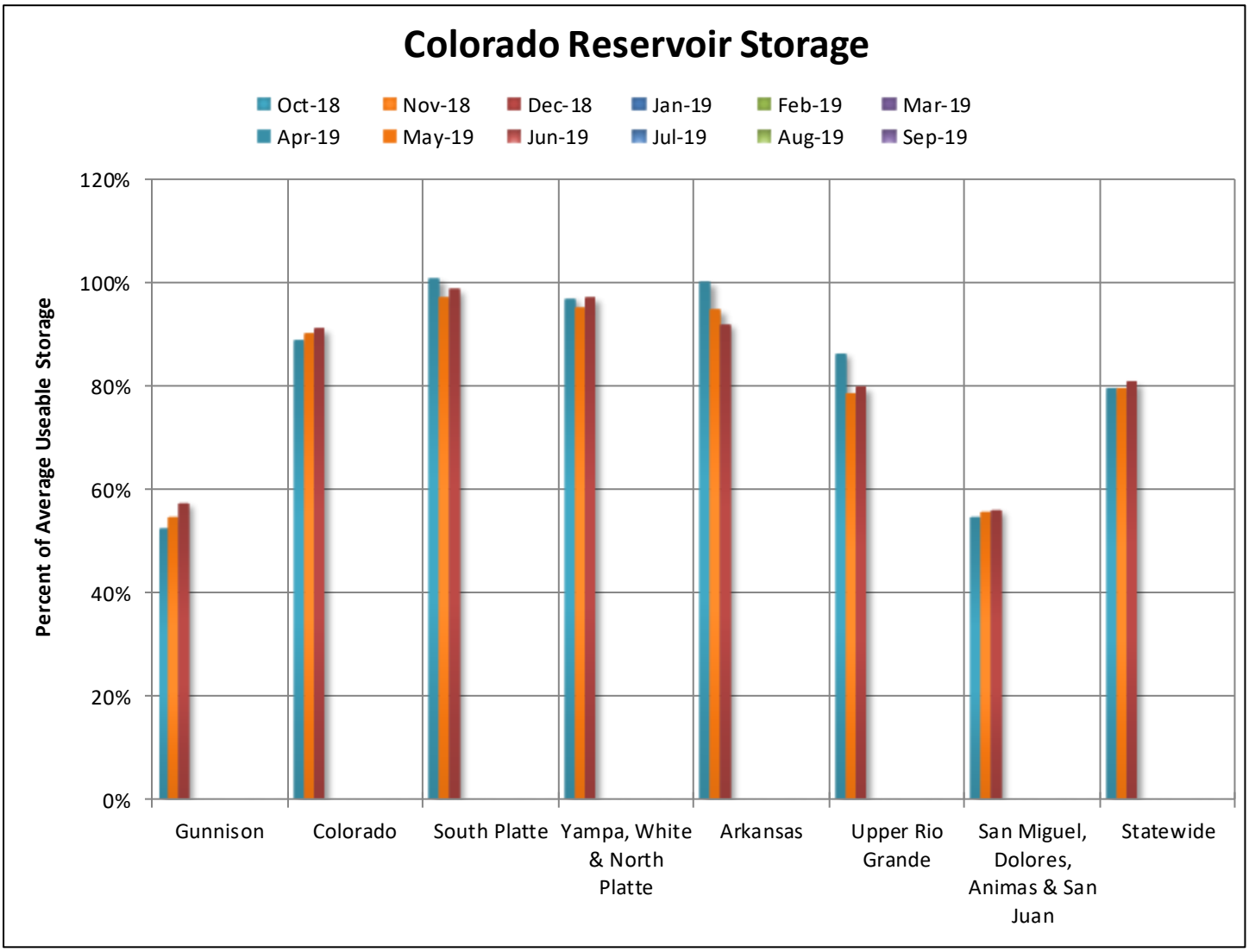

The 2019 water year had a promising start when an early season storm favoring the southern mountains dumped snow across the state, leaving most major river basins with above normal snowpacks. Conditions have since changed for southern Colorado where November and December have brought snowfall accumulations that are close to only half of normal amounts for the Rio Grande and combined San Miguel, Dolores, Animas, and San Juan River basins. This has led to a decline in the percent of normal snowpack for these basins, from above 200 percent of median on November 1st to 70 percent or less on January 1st. While better than last year, this is not the start many are hoping for in the parched southwest, where those river basins failed to reach snowpack levels above 60 percent of normal at any point last year. The mountains in Colorado's other river basins are holding more plentiful snowpacks thanks to consistent snowfall through October and November. December accumulations were below normal across the state, but prior snowfall buffered against any major decreases in the percent of normal for most basins. The Arkansas and South Platte River basins have the most abundant snowpacks, with respect to normal, at 116 and 112 percent, respectively. The Colorado and combined Yampa, White, and North Platte River basins are also above normal at 107 and 104 percent of median, respectively, while the Gunnison River basin is maintaining a modest snowpack at 91 percent of median. Statewide, Colorado's mountain snowpack is at 93 percent of normal. About three months remain in the accumulation season before most mountain locations reach peak snowpack levels, leaving time for an uptick in snowfall to improve conditions in the southwest. About 120 percent of normal future snow accumulations are needed to bring the southern basins to normal levels, which is certainly possible. However, another month with subpar snowfall will make normal snowpack levels prior to runoff difficult to achieve.

## Precipitation




Water Year 2019 got off to a great start with all major basins receiving above average precipitation in October. This ranged from a low of 109 percent of average in the combined Yampa, White, and North Platte basins to a high of 144 percent in the combined San Miguel, Dolores, Animas, and San Juan basins of Southwest Colorado. November precipitation displayed notable differences between the northern and southern parts of the state. Northern Colorado continued to receive well above average precipitation while the Rio Grande and combined southwest basins got a meager 53 and 40 percent of average precipitation, respectively. Precipitation patterns shifted again in December with all of Colorado receiving below average precipitation in a more consistent manner. All major basins were in the range of 57 to 74 percent of average precipitation for the month. Statewide this has left Colorado with near normal water-year-to-date precipitation, at 97 percent of average. Largely driven by the differences observed in November, central and northern Colorado generally has near to above average water year precipitation and most of southern Colorado has lower than average water year precipitation. The South Platte and Upper Colorado basins have the highest values at 114 and 107 percent of normal, respectively. The Combined Yampa, White, and North Platte along with the Arkansas and Gunnison basins are near normal with 101, 98, and 97 percent of average, respectively. That leaves the Upper Rio Grande and basins of Southwest Colorado with the least water year precipitation, at 84 and 80 percent, respectively.

## Reservoir Storage

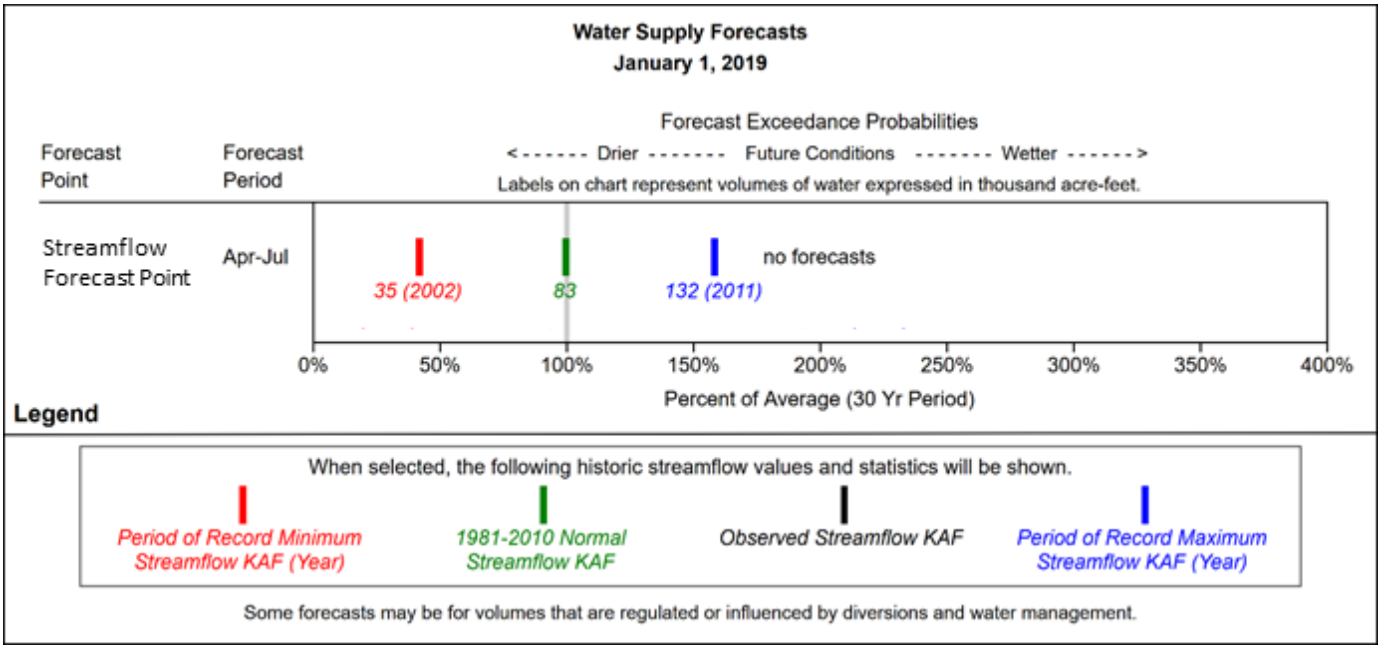



While reservoir storage is near to well below average in all major basins of Colorado, every basin except the Arkansas did show some degree of increase in storage over the last month, relative to normal values. Currently statewide reservoir storage is 81 percent of average. The South Platte and combined Yampa and White basins have close to normal storage for this time of year at 99 and 97 percent of average, respectively. The Arkansas and Colorado basins are holding slightly lower values but still relatively close to normal, at 92 and 91 percent of average, respectively. The Upper Rio Grande basin is in the middle of the pack, holding 80 percent of average storage. While this basin doesn't have the most total storage they are at least in a much better position than other basins that also had a notably dry water year 2018. The Gunnison Basin is holding only 58 percent of average storage which is 39 percent of capacity. A large driver of this is from Blue Mesa Reservoir, the largest in the state, which has been at the lowest levels since 1984 over the last several months. Storage in the combined San Miguel, Dolores, Animas, and San Juan basins is currently even slightly lower, at 56 percent of average. All four of these major rivers observed their third lowest April-July streamflows last summer with periods of record ranging from 61 to 107 years leading to sharp declines in reservoir storage. Given these very low values across Southwest Colorado another year of low snowpack could lead to challenging water resource issues next summer.

## Streamflow

Due to current staffing, most official forecasts only will be available February through May. If you rely on the January or June forecasts, please contact cara.s.mccarthy@por.usda.gov or Brian.Domonkos@co.usda.gov.

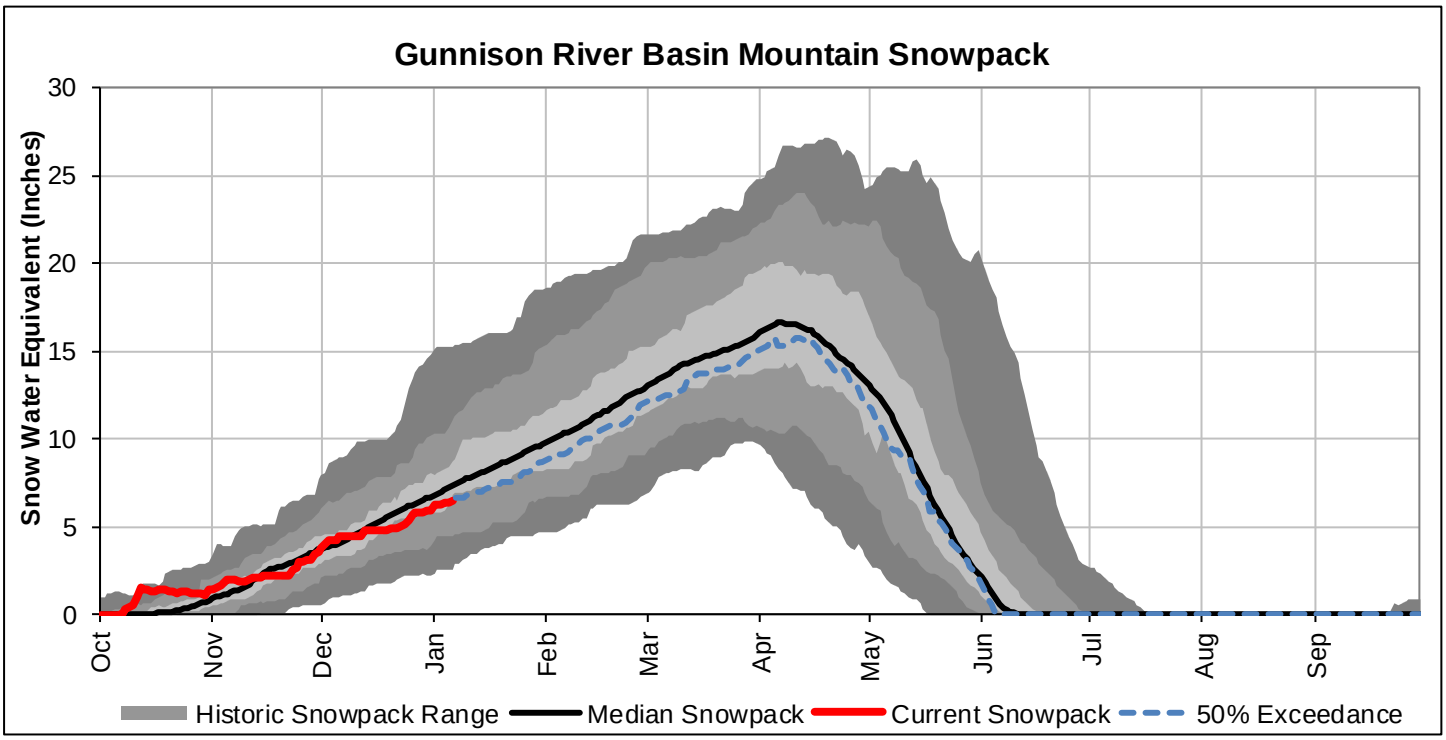
In the river basin sections of the report that follow, the typical graphic displaying the range of forecast exceedance probabilities has been replaced with a new chart. The new graphic displays the historic range of observed streamflows for all the forecast points in each of the major river basins. In the example image provided below, the red line represents the minimum observed volume; the green line, average volume; and the blue line, the maximum observed streamflow volume. The numbers below the lines are the observed streamflow volumes in thousand acre-feet (KAF) followed by the year of observed flow in parentheses. At the end of this report, there is further explanation of these graphics for periods when streamflow forecasts are available.



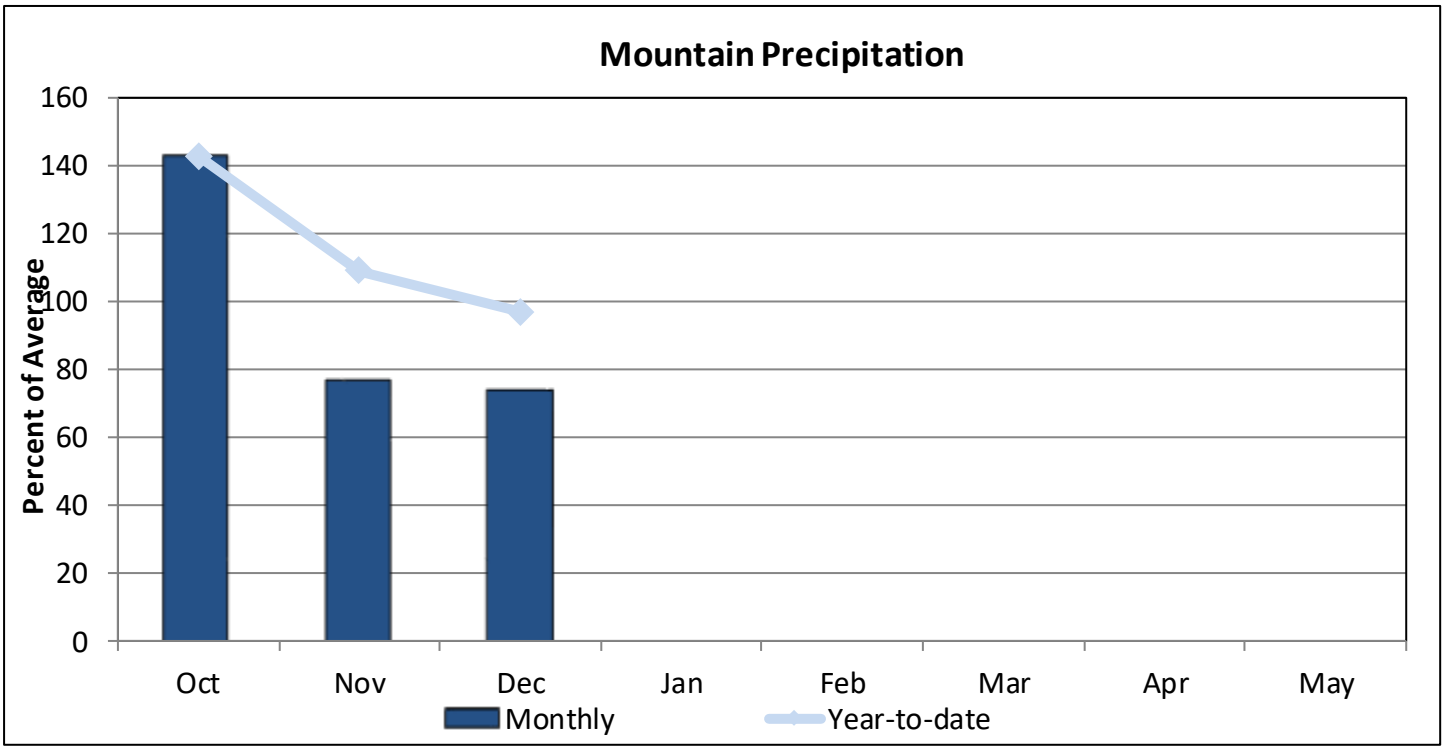
# GUNNISON RIVER BASIN

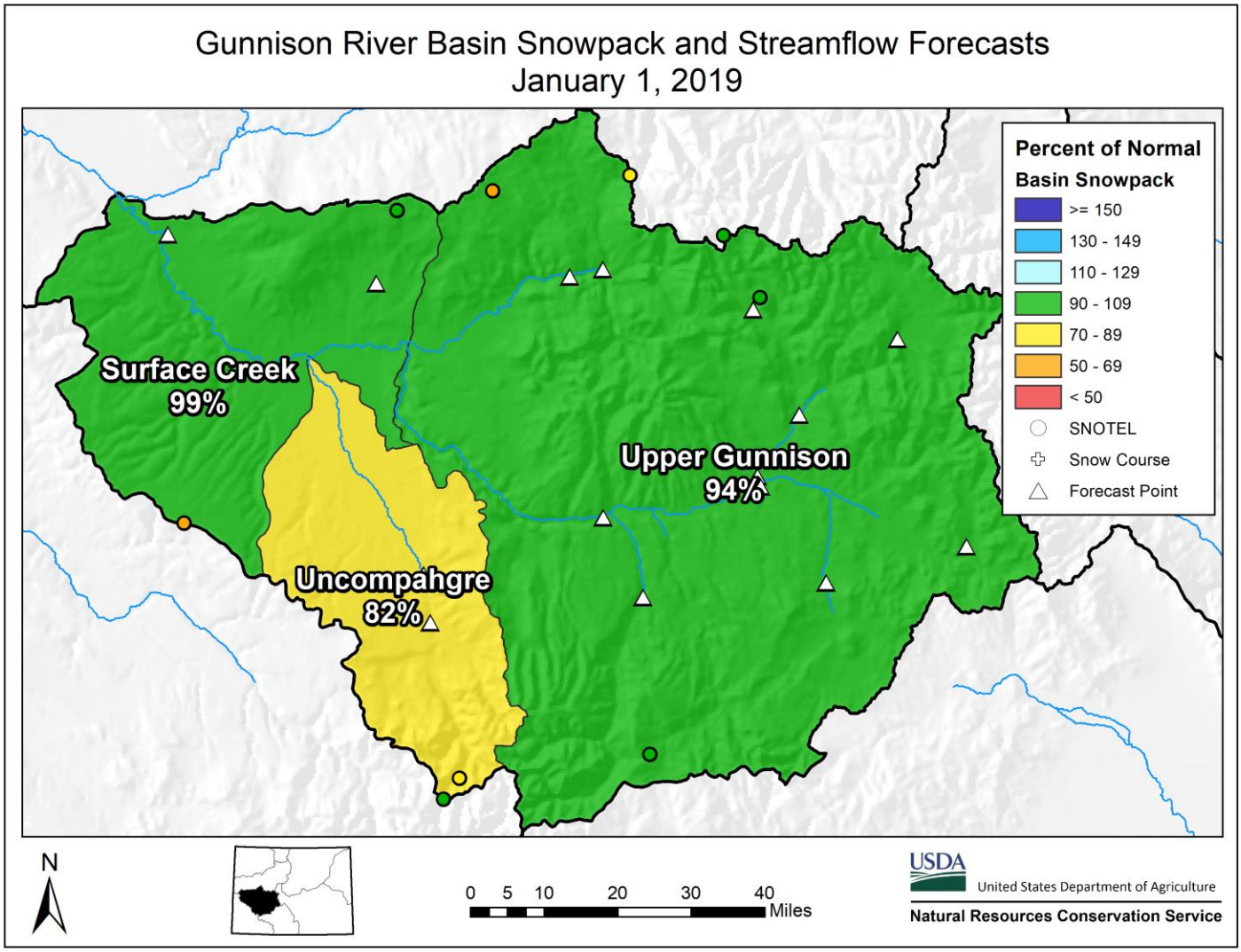
January 1, 2019

Snowpack in the Gunnison River basin is below normal at 91% of the median. Precipitation for December was 74% of average which brings water year-to-date precipitation to 97% of average. Reservoir storage at the end of December was 58% of average compared to 104% last year. No forecasts are available for January.




*SWE values calculated using daily SNOTEL data only

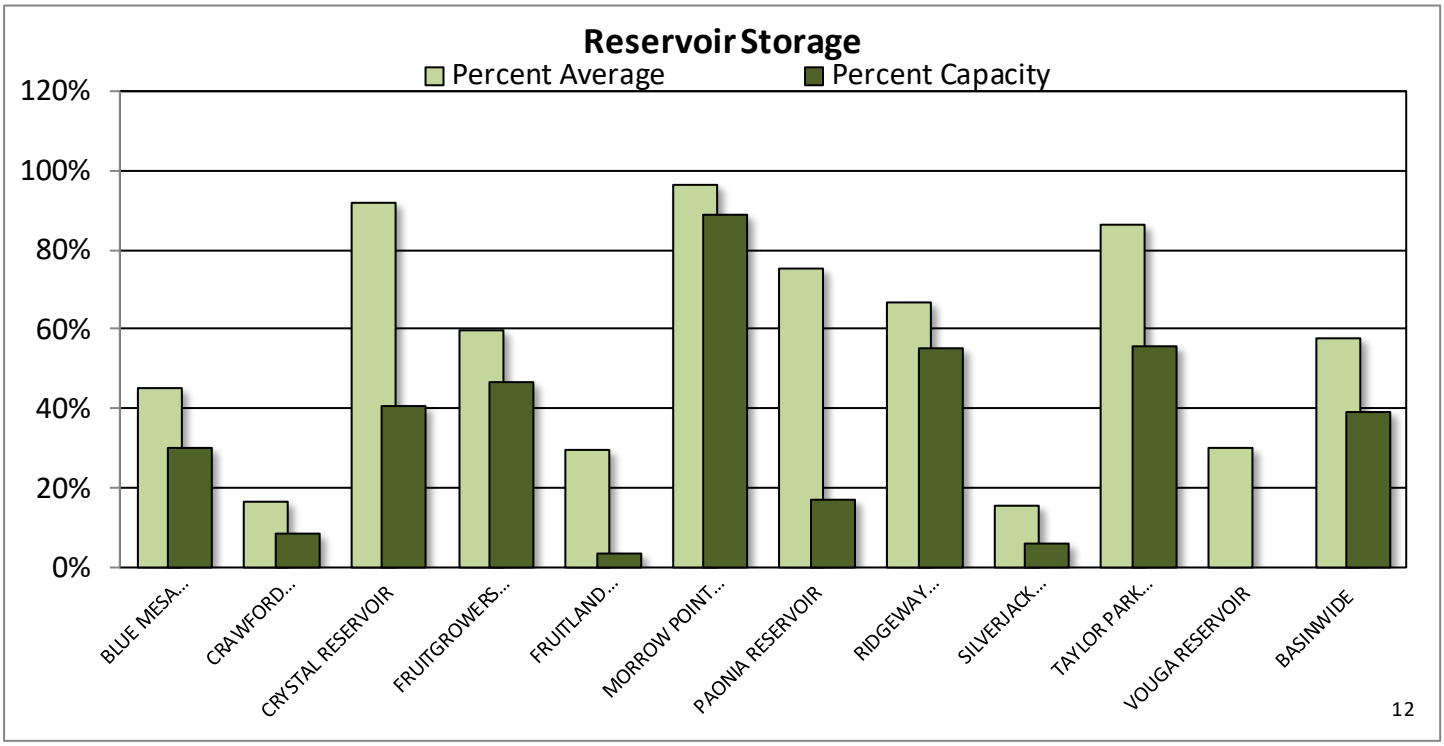





**Watershed Snowpack Analysis January 1st, 2019**

| Sub-Basin | # of Sites | % Median | Last Year % Median |
|---|---|---|---|
| Upper Gunnison | 10 | 94 | 41 |
| Surface Creek | 2 | 99 | 16 |
| Uncompahgre | 3 | 82 | 26 |
| **Basin-Wide Total** | 13 | 91 | 37 |

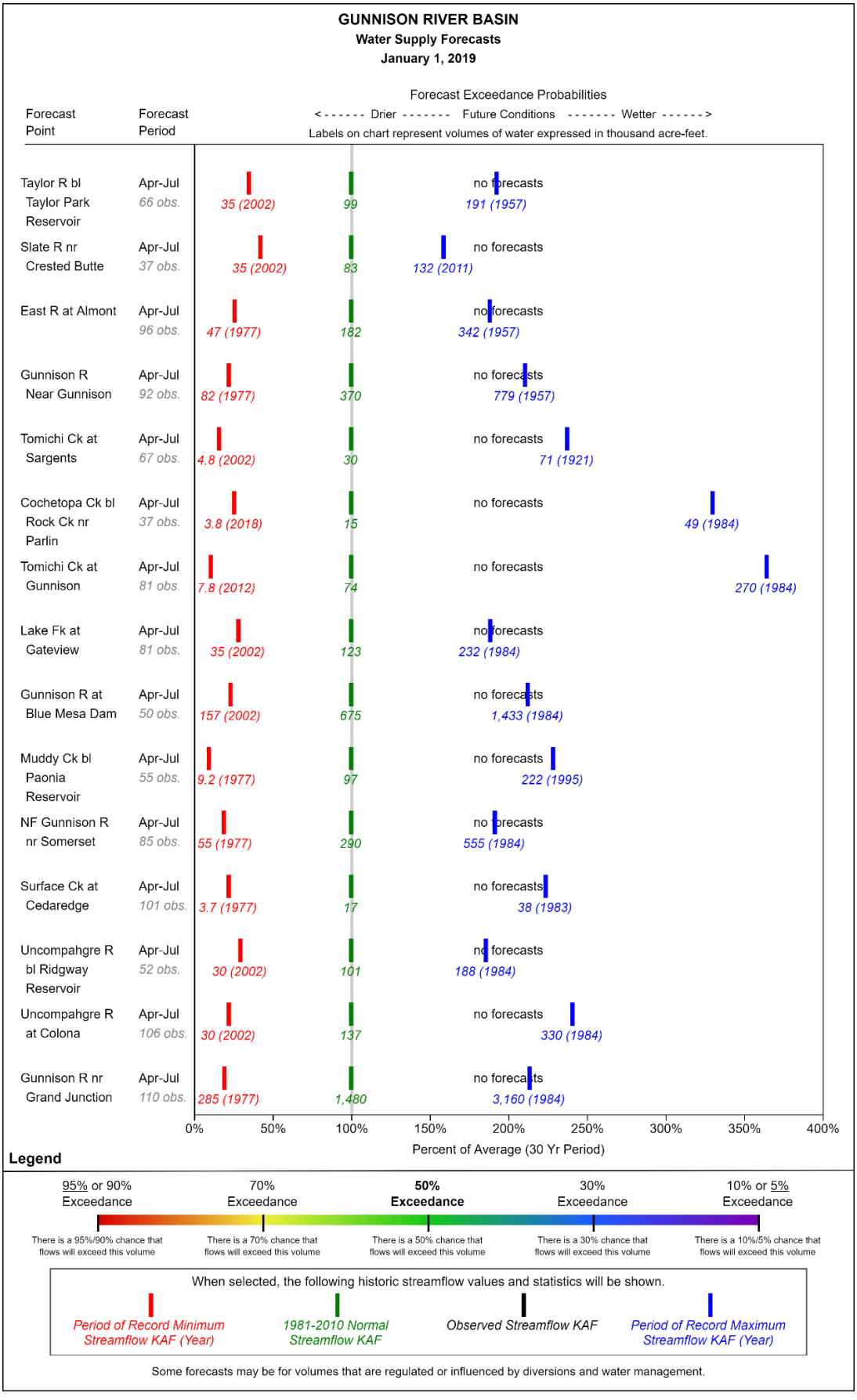
*SWE values calculated using first of month SNOTEL data and snow course measurements




**Reservoir Storage End of December 2018**

| Reservoir | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|---|---|---|---|---|
| BLUE MESA RESERVOIR | 248.8 | 592.6 | 549.9 | 830.0 |
| CRAWFORD RESERVOIR | 1.2 | 4.6 | 7.1 | 14.0 |
| CRYSTAL RESERVOIR | 7.1 | 8.2 | 7.7 | 17.5 |
| FRUITGROWERS RESERVOIR | 1.7 | 1.6 | 2.8 | 3.6 |
| FRUITLAND RESERVOIR | 0.3 | 0.5 | 1.0 | 9.2 |
| MORROW POINT RESERVOIR | 107.6 | 111.0 | 111.6 | 121.0 |
| PAONIA RESERVOIR | 2.6 | 2.1 | 3.5 | 15.4 |
| RIDGEWAY RESERVOIR | 45.9 | 60.3 | 68.8 | 83.0 |
| SILVERJACK RESERVOIR | 0.8 | 2.2 | 5.0 | 12.8 |
| TAYLOR PARK RESERVOIR | 59.0 | 76.2 | 68.1 | 106.0 |
| VOUGA RESERVOIR | 0.2 | 0.6 | 0.7 | 0.9 |
| **BASINWIDE** | 475.1 | 859.8 | 826.2 | 1213.4 |
| Number of Reservoirs | 11 | 11 | 11 | 11 |

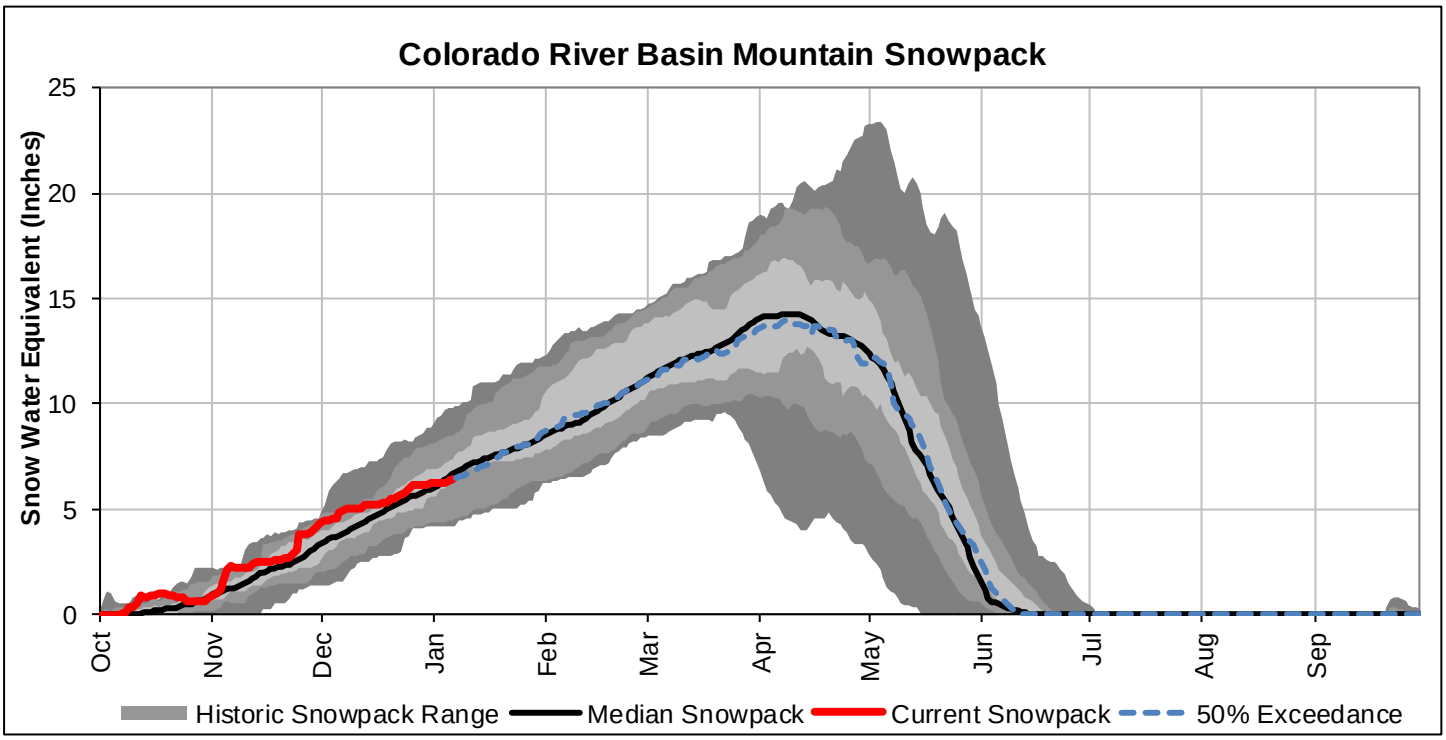
Due to current staffing, most official forecasts only will be available February through May. If you rely on the January or June forecasts, please contact cara.s.mccarthy@por.usda.gov or Brian.Domonkos@co.usda.gov. The following graphic displays the historic range of observed streamflows for reference during months where forecasts are not available. Red = minimum, green = average, and blue = maximum observed flow.



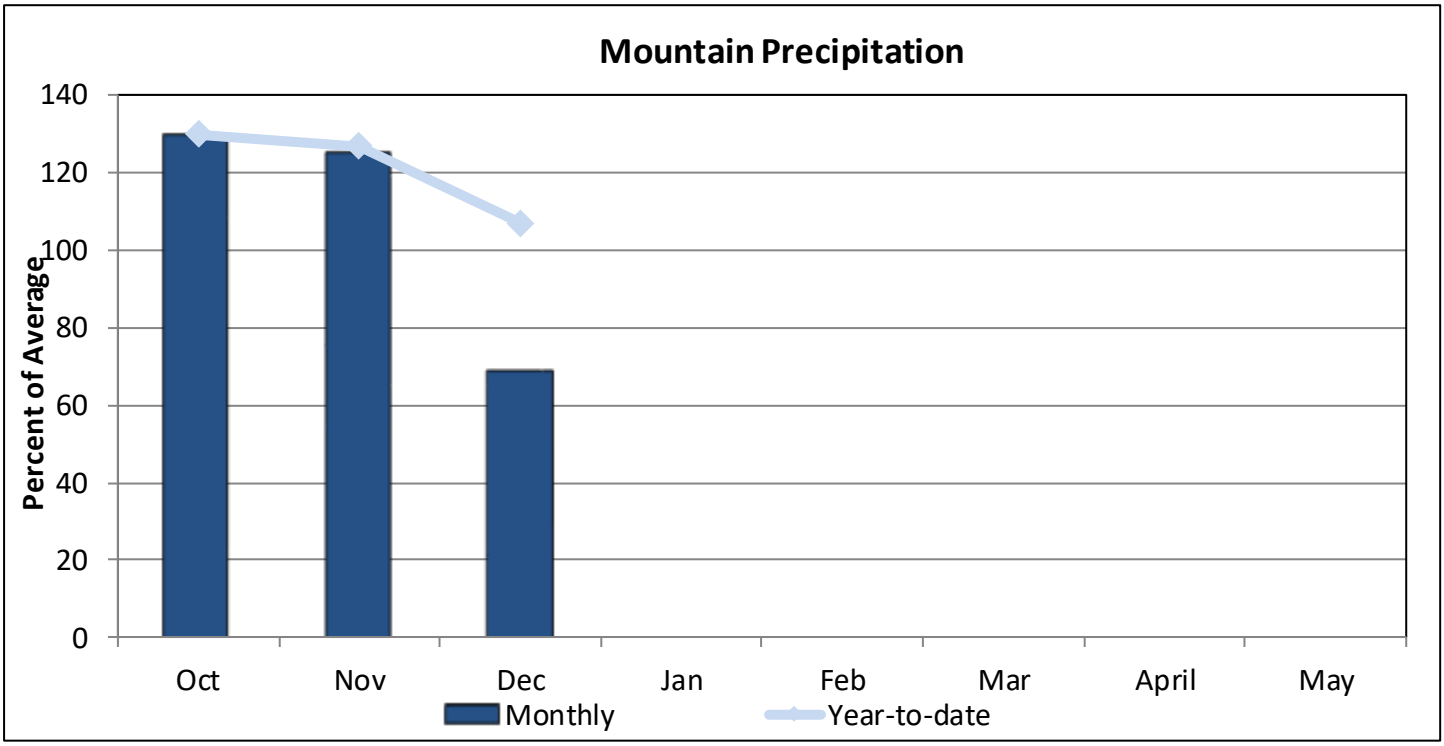
# UPPER COLORADO RIVER BASIN

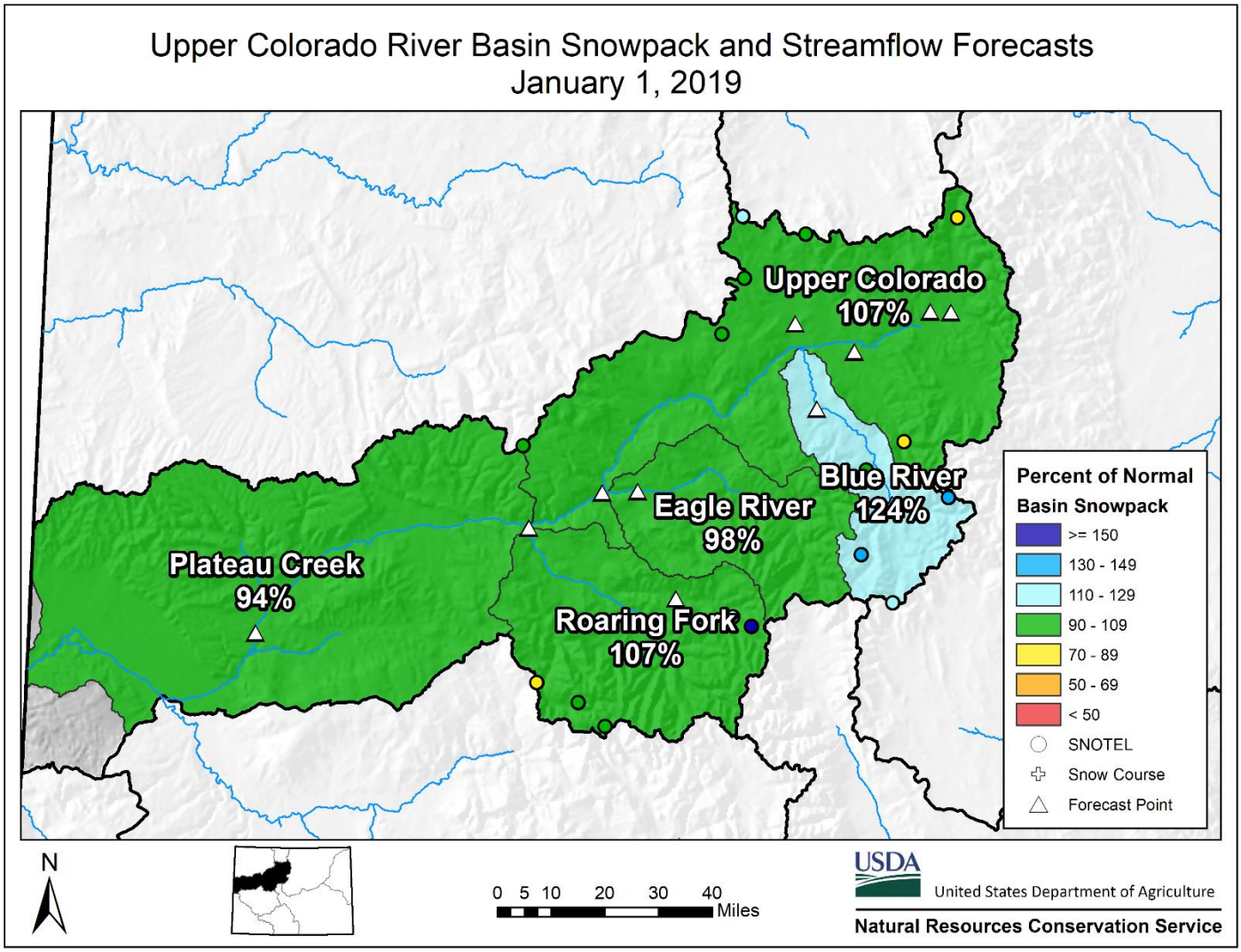
January 1, 2019

Snowpack in the Colorado River basin is above normal at 107% of the median. Precipitation for December was 69% of average which brings water year-to-date precipitation to 107% of average. Reservoir storage at the end of December was 91% of average compared to 113% last year. No forecasts are available for January.




*SWE values calculated using daily SNOTEL data only

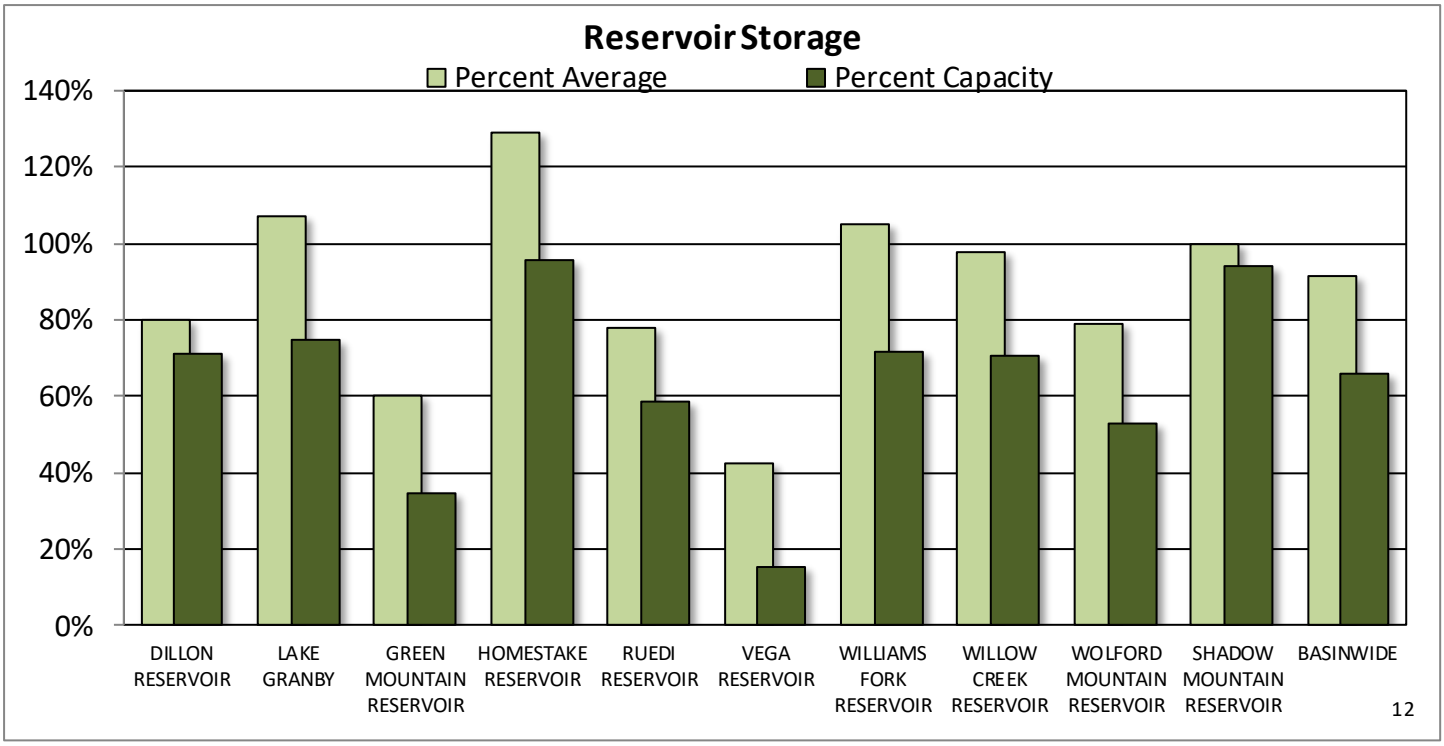





**Watershed Snowpack Analysis January 1st, 2019**

| Sub-Basin | # of Sites | % Median | Last Year % Median |
|---|---|---|---|
| Blue River | 5 | 124 | 87 |
| Upper Colorado | 19 | 107 | 78 |
| Muddy Creek | 3 | 109 | 96 |
| Eagle River | 4 | 98 | 48 |
| Plateau Creek | 5 | 94 | 27 |
| Roaring Fork | 7 | 107 | 60 |
| Williams Fork | 3 | 104 | 64 |
| Willow Creek | 2 | 113 | 119 |
| **Basin-Wide Total** | 28 | 107 | 69 |

*SWE values calculated using first of month SNOTEL data and snow course measurements




**Reservoir Storage End of December 2018**

| Reservoir | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|---|---|---|---|---|
| DILLON RESERVOIR | 177.7 | 236.3 | 222.1 | 249.1 |
| LAKE GRANBY | 348.6 | 437.4 | 325.7 | 465.6 |
| GREEN MOUNTAIN RESERVOIR | 51.0 | 66.7 | 85.2 | 146.8 |
| HOMESTAKE RESERVOIR | 41.2 | 41.1 | 31.9 | 43.0 |
| RUEDI RESERVOIR | 60.0 | 72.1 | 76.8 | 102.0 |
| VEGA RESERVOIR | 5.0 | 9.6 | 11.8 | 32.9 |
| WILLIAMS FORK RESERVOIR | 69.7 | 66.0 | 66.5 | 97.0 |
| WILLOW CREEK RESERVOIR | 6.4 | 5.9 | 6.6 | 9.1 |
| WOLFORD MOUNTAIN RESERVOIR | 34.7 | 55.0 | 44.0 | 65.9 |
| SHADOW MOUNTAIN RESERVOIR | 17.3 | 17.3 | 17.3 | 18.4 |
| **BASINWIDE** | 811.7 | 1007.4 | 887.9 | 1229.8 |
| Number of Reservoirs | 10 | 10 | 10 | 10 |

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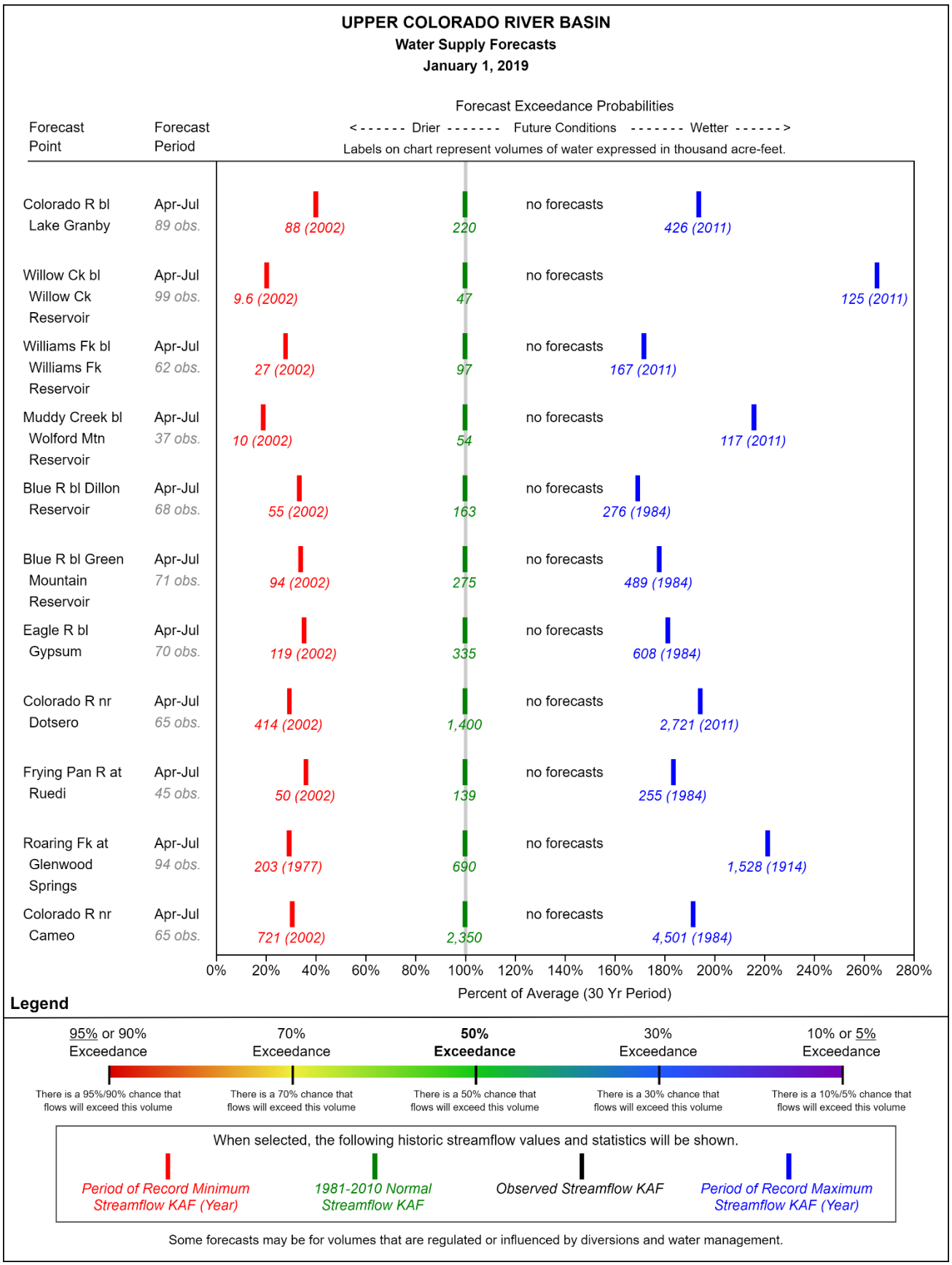
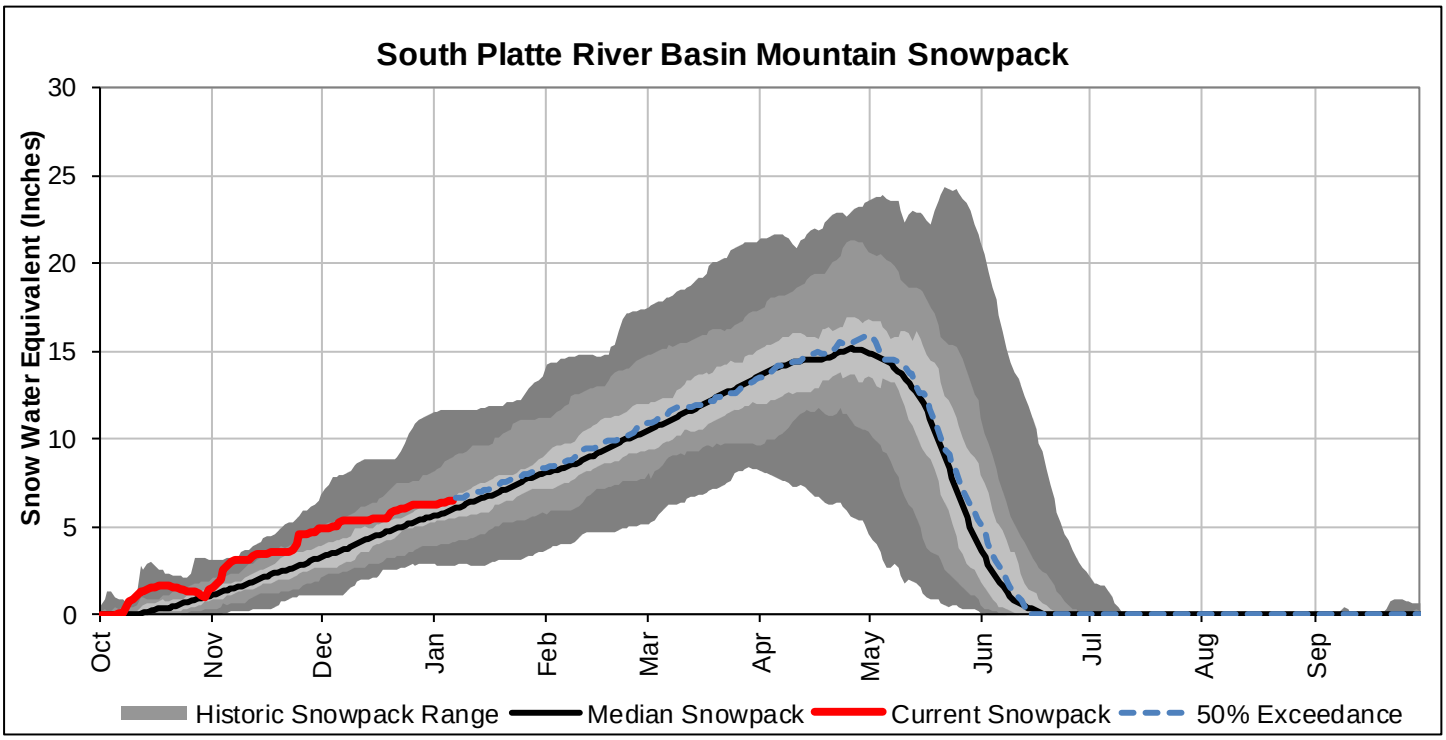


# SOUTH PLATTE RIVER BASIN

January 1, 2019

Snowpack in the South Platte River basin is above normal at 112% of the median. Precipitation for December was 62% of average which brings water year-to-date precipitation to 114%. Reservoir storage at the end of December was 99% of average compared to 114% last year. No forecasts are available for January.

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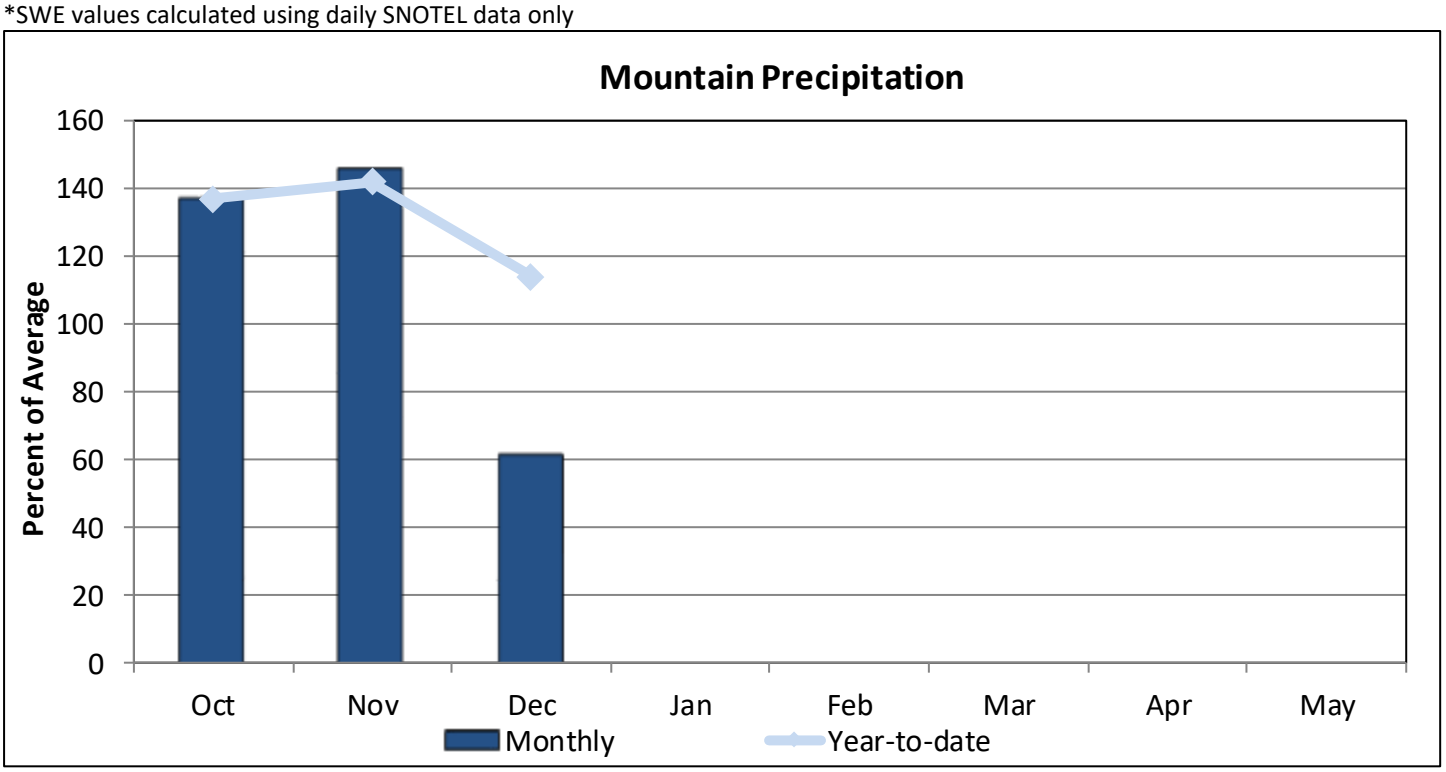
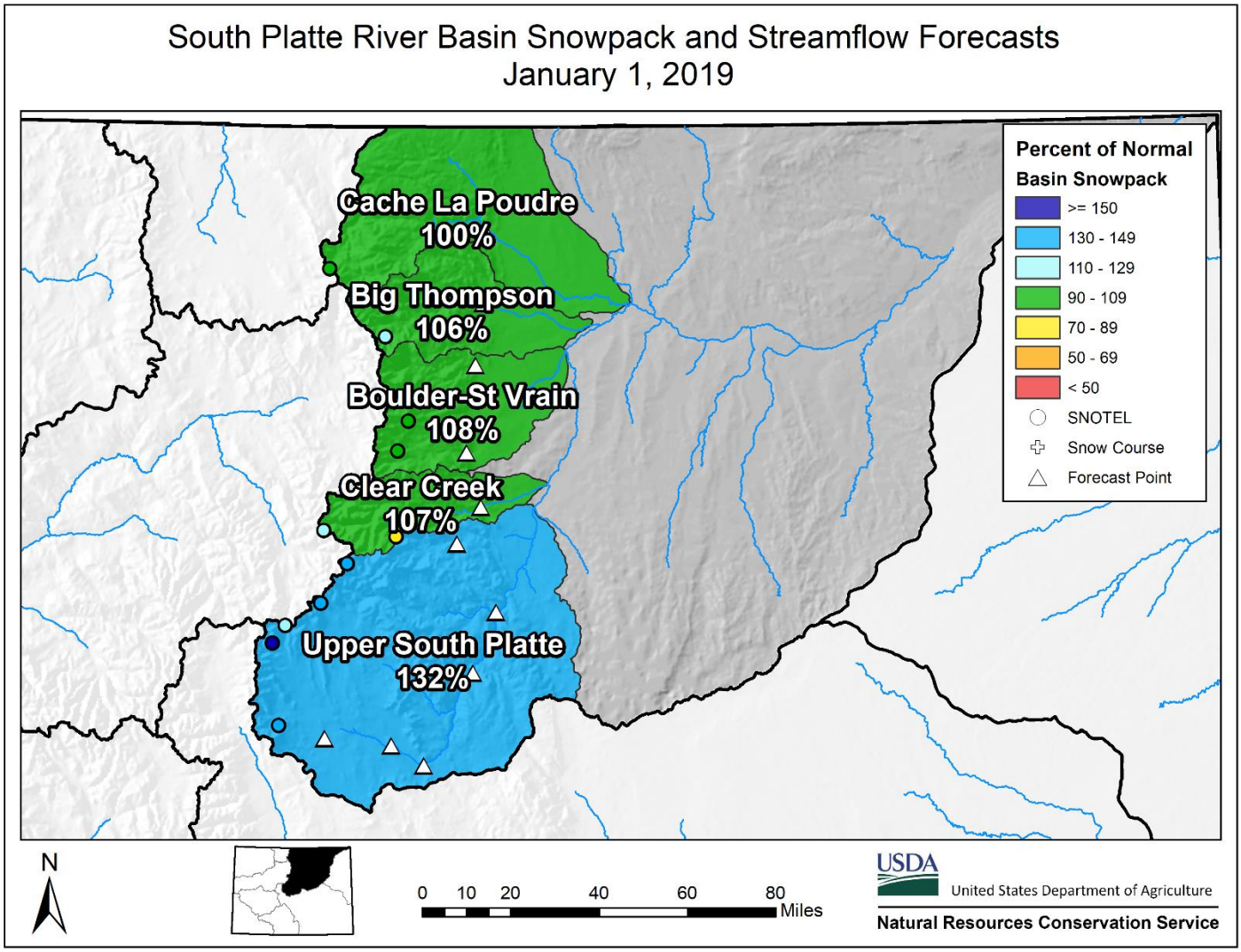
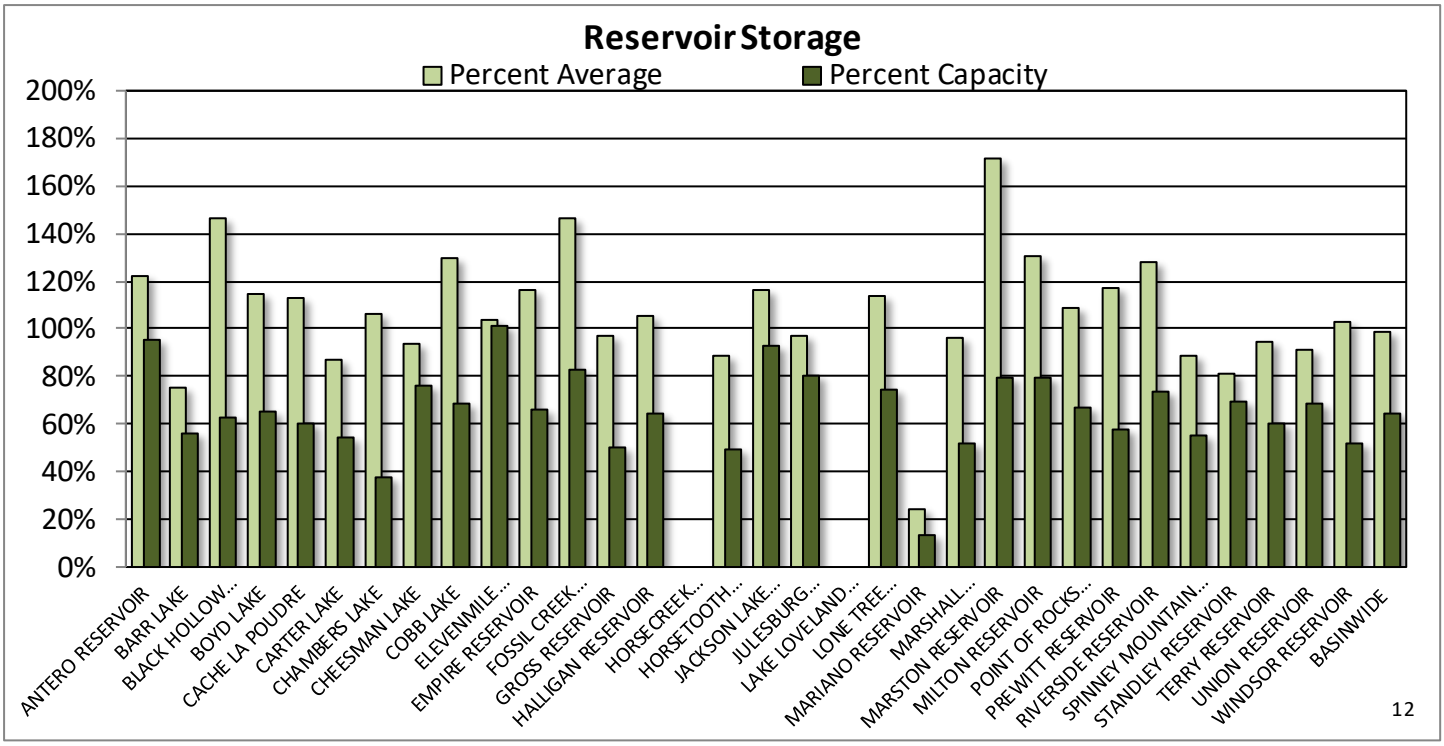





**Watershed Snowpack Analysis January 1st, 2019**

| Sub-Basin | # of Sites | % Median | Last Year % Median |
|---|---|---|---|
| Big Thompson | 3 | 106 | 80 |
| Boulder Creek | 3 | 104 | 92 |
| Cache La Poudre | 2 | 100 | 100 |
| Clear Creek | 2 | 107 | 86 |
| Saint Vrain | 1 | 133 | 67 |
| Upper South Platte | 6 | 132 | 82 |
| **Basin-Wide Total** | 17 | 112 | 86 |

*SWE values calculated using first of month SNOTEL data and snow course measurements






**Reservoir Storage End of December 2018**

| Reservoir | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|---|---|---|---|---|
| ANTERO RESERVOIR | 18.9 | 20.1 | 15.5 | 19.9 |
| BARR LAKE | 16.8 | 26.9 | 22.3 | 30.1 |
| BLACK HOLLOW RESERVOIR | 4.1 | 3.4 | 2.8 | 6.5 |
| BOYD LAKE | 31.5 | 33.0 | 27.4 | 48.4 |
| CACHE LA POUDRE | 6.1 | 8.9 | 5.4 | 10.1 |
| CARTER LAKE | 58.7 | 49.3 | 67.5 | 108.9 |
| CHAMBERS LAKE | 3.3 | 6.4 | 3.1 | 8.8 |
| CHEESMAN LAKE | 60.0 | 72.2 | 64.3 | 79.0 |
| COBB LAKE | 15.2 | 19.2 | 11.7 | 22.3 |
| ELEVENMILE CANYON RESERVOIR | 99.2 | 100.0 | 95.9 | 98.0 |
| EMPIRE RESERVOIR | 24.0 | 25.1 | 20.6 | 36.5 |
| FOSSIL CREEK RESERVOIR | 9.2 | 9.3 | 6.3 | 11.1 |
| GROSS RESERVOIR | 14.9 | 18.6 | 15.4 | 29.8 |
| HALLIGAN RESERVOIR | 4.1 | 6.4 | 3.9 | 6.4 |
| HORSECREEK RESERVOIR | 0.0 | 7.7 | 8.5 | 14.7 |
| HORSETOOTH RESERVOIR | 74.0 | 76.5 | 83.5 | 149.7 |
| JACKSON LAKE RESERVOIR | 24.3 | 24.2 | 20.9 | 26.1 |
| JULESBURG RESERVOIR | 16.5 | 16.5 | 17.0 | 20.5 |
| LAKE LOVELAND RESERVOIR | 0.0 | 6.3 | 6.8 | 10.3 |
| LONE TREE RESERVOIR | 6.5 | 6.9 | 5.7 | 8.7 |
| MARIANO RESERVOIR | 0.7 | 4.0 | 2.9 | 5.4 |
| MARSHALL RESERVOIR | 5.2 | 6.6 | 5.4 | 10.0 |
| MARSTON RESERVOIR | 10.3 | 7.2 | 6.0 | 13.0 |
| MILTON RESERVOIR | 18.7 | 19.1 | 14.3 | 23.5 |
| POINT OF ROCKS RESERVOIR | 47.2 | 51.7 | 43.3 | 70.6 |
| PREWITT RESERVOIR | 16.3 | 21.1 | 13.9 | 28.2 |
| RIVERSIDE RESERVOIR | 41.2 | 47.0 | 32.1 | 55.8 |
| SPINNEY MOUNTAIN RESERVOIR | 27.0 | 36.3 | 30.5 | 49.0 |
| STANDLEY RESERVOIR | 29.0 | 41.2 | 35.8 | 42.0 |
| TERRY RESERVOIR | 4.8 | 5.8 | 5.1 | 8.0 |
| UNION RESERVOIR | 8.9 | 11.1 | 9.8 | 13.0 |
| WINDSOR RESERVOIR | 7.9 | 9.8 | 7.7 | 15.2 |
| **BASINWIDE** | 704.5 | 797.7 | 711.3 | 1079.5 |
| Number of Reservoirs | 32 | 32 | 32 | 32 |

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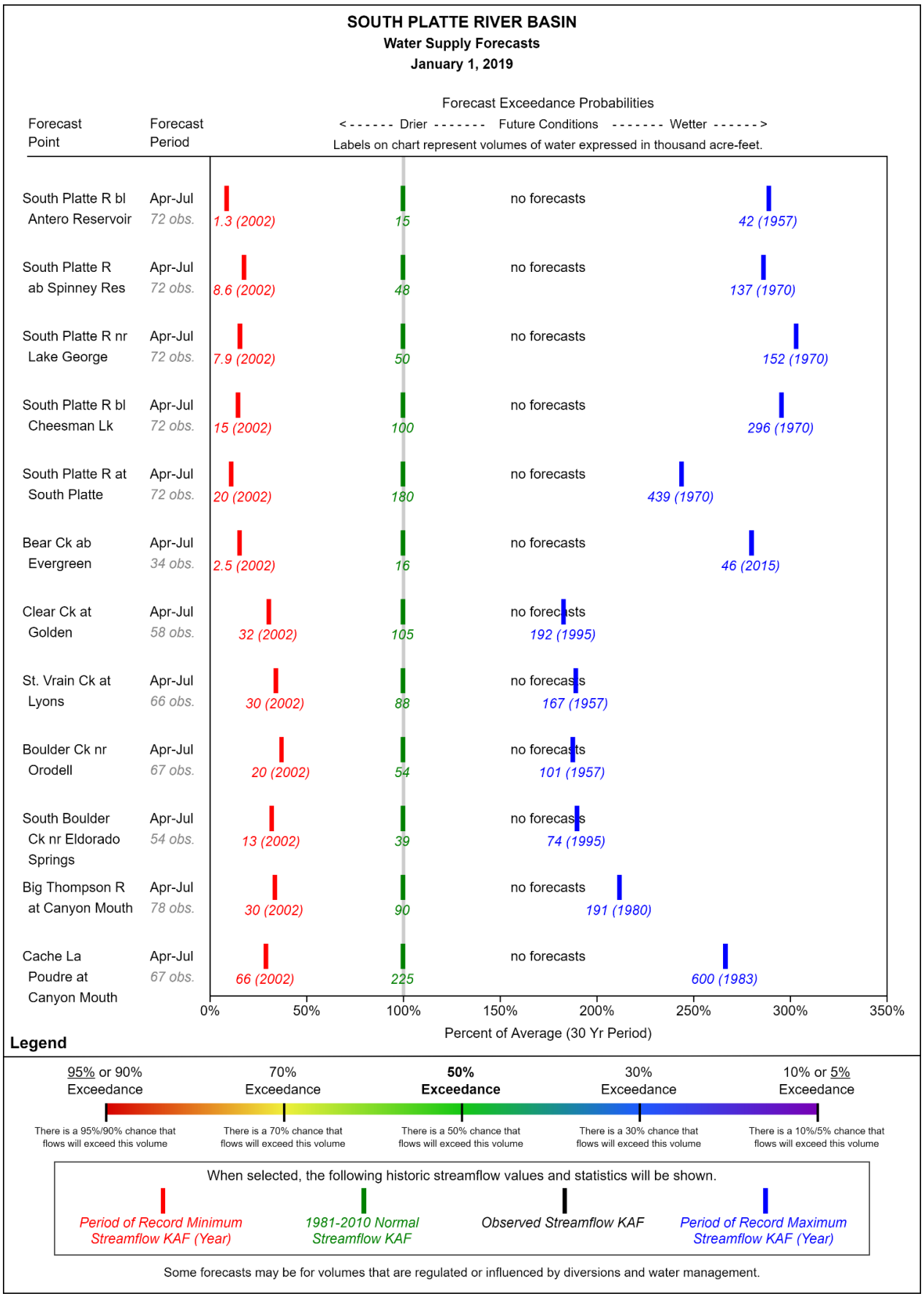
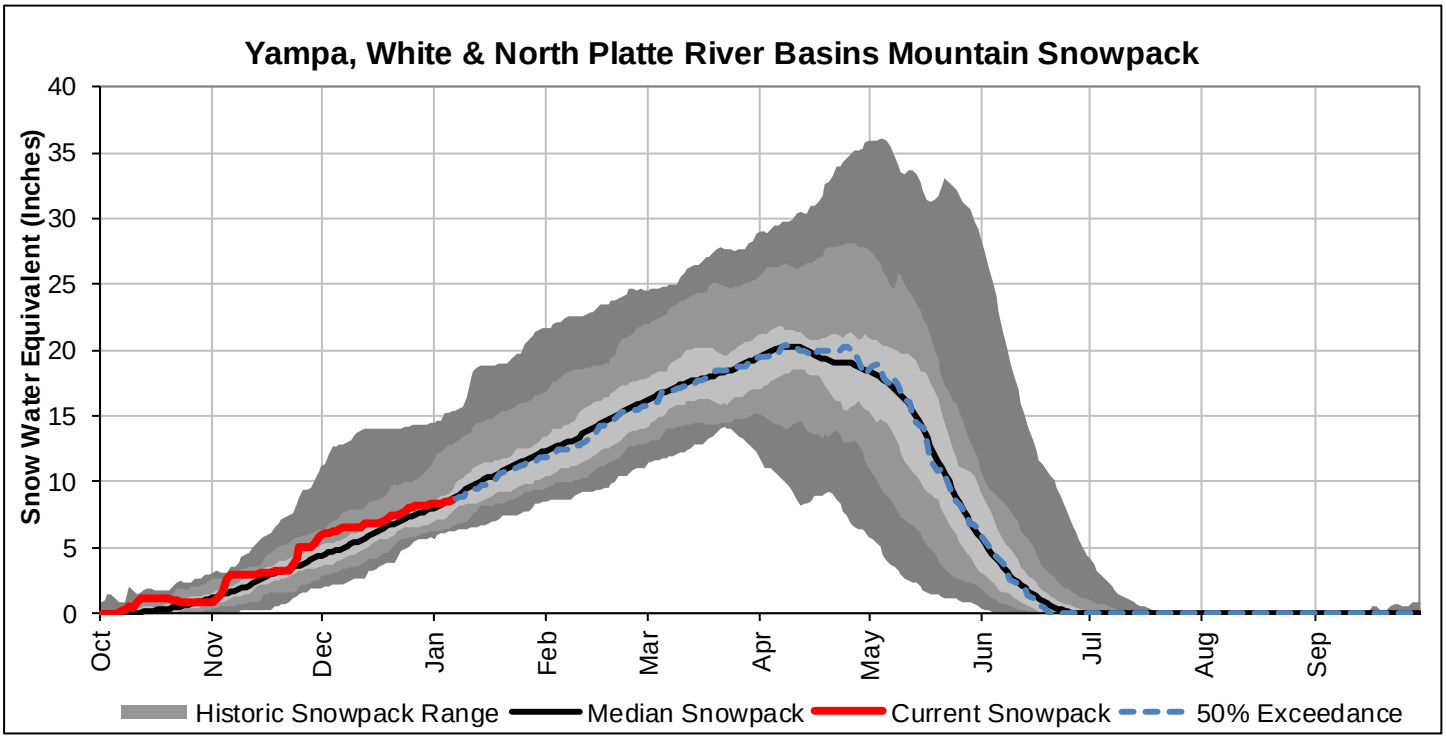


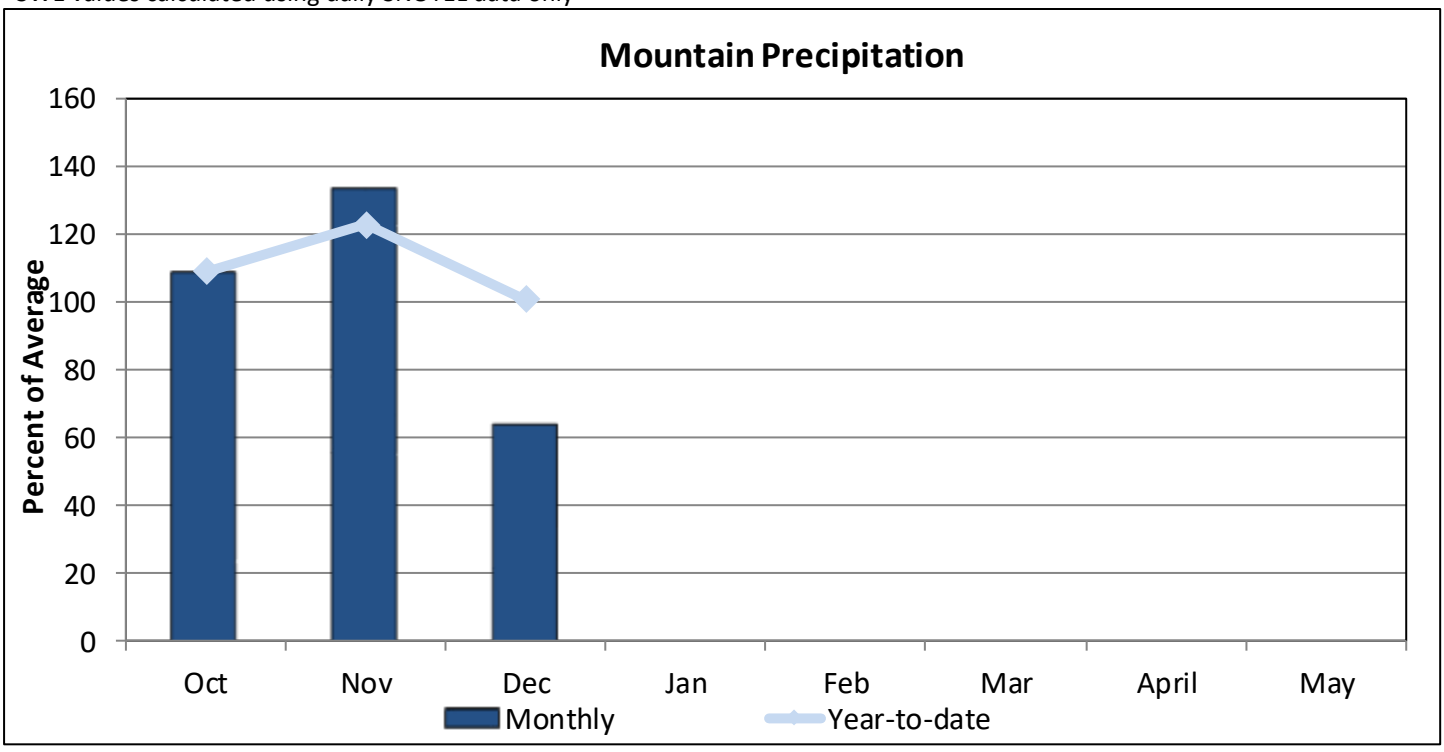
# YAMPA, WHITE, NORTH PLATTE, AND LARAMIE RIVER BASINS

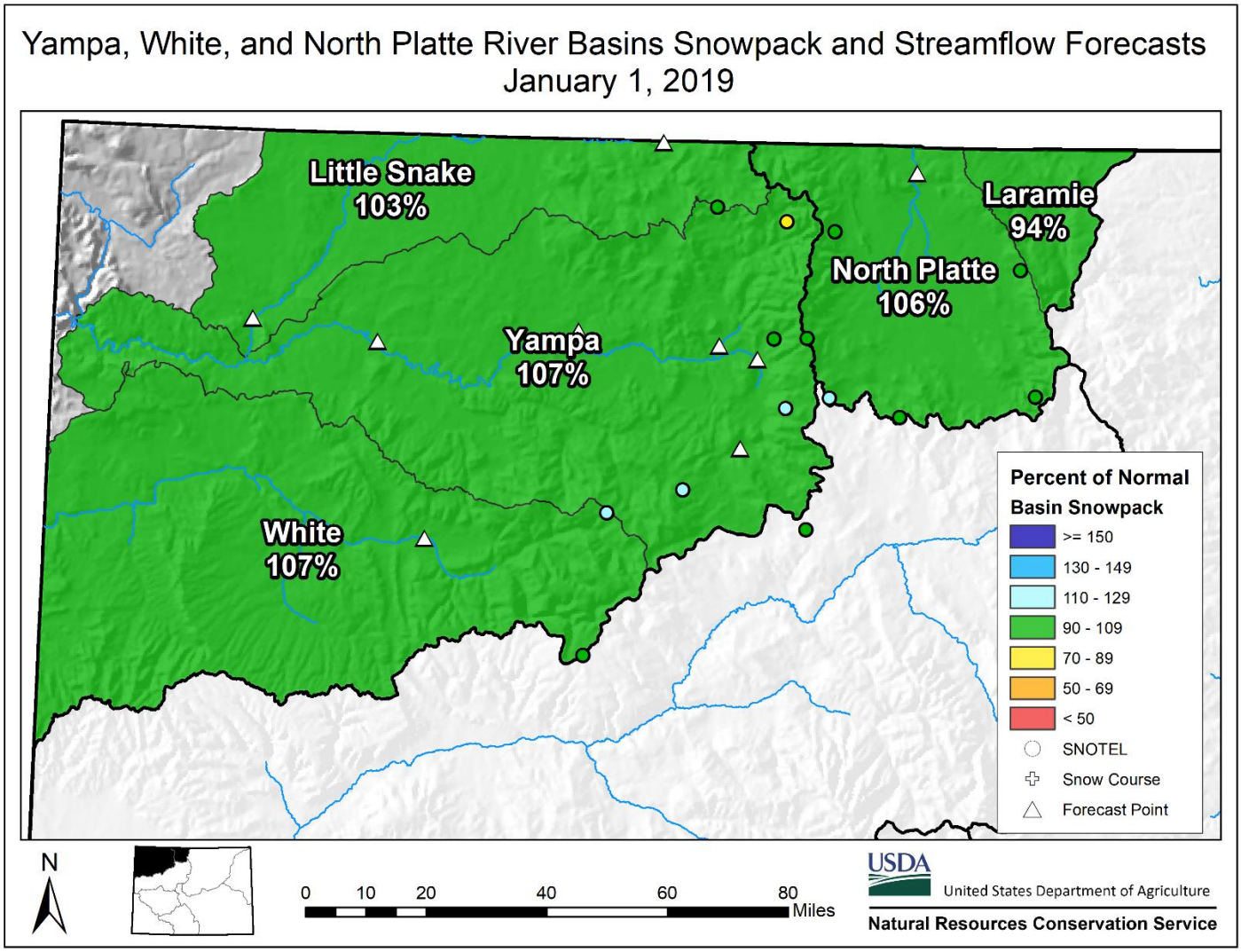
January 1, 2019

Snowpack in the Yampa, White & North Platte basins is above normal at 104% of the median. Precipitation for December was 64% of average and water year-to-date precipitation is 101% of average. Reservoir storage at the end of December was 97% of average compared to 117% last year. No forecasts are available for January.




*SWE values calculated using daily SNOTEL data only

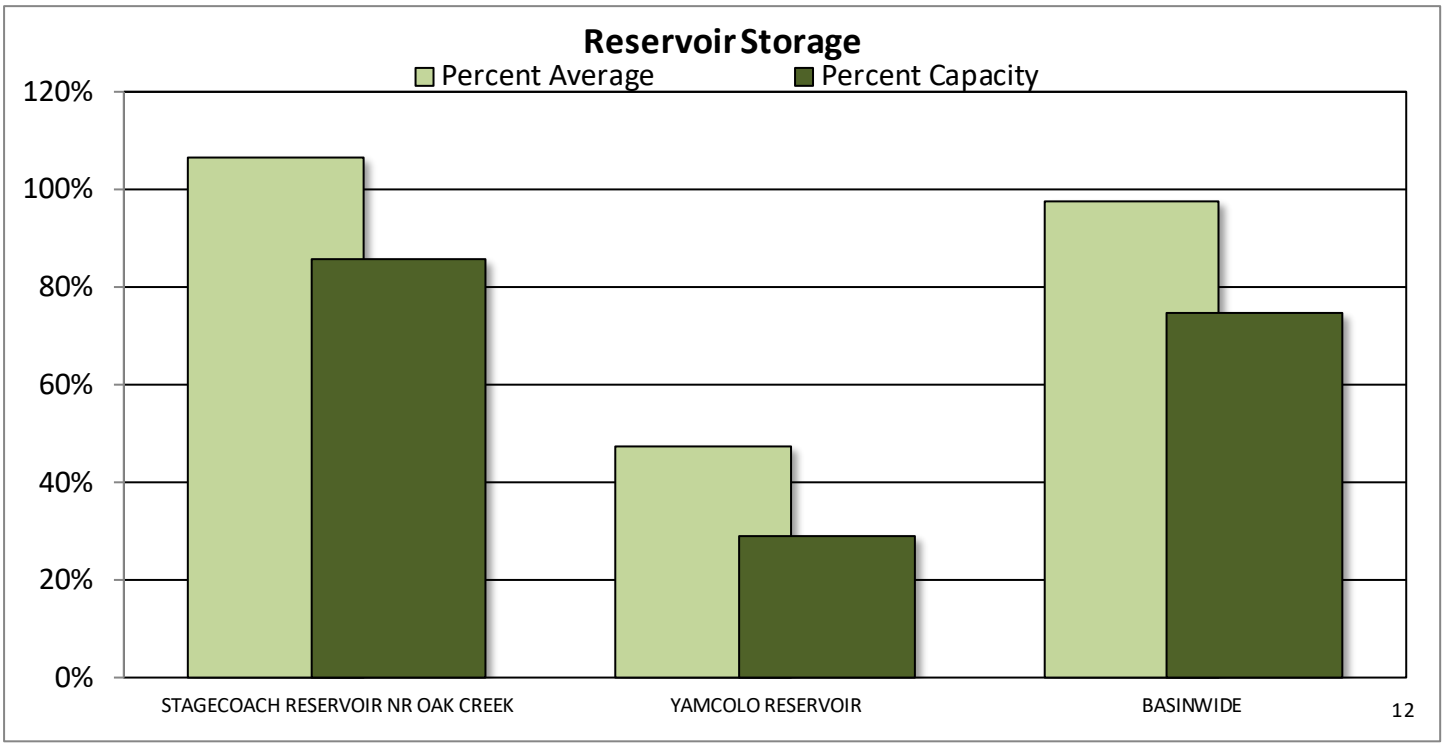





**Watershed Snowpack Analysis January 1st, 2019**

| Sub-Basin | # of Sites | % Median | Last Year % Median |
|---|---|---|---|
| Laramie | 2 | 94 | 118 |
| North Platte | 8 | 106 | 83 |
| Total Laramie & North Platte | 10 | 104 | 89 |
| Elk | 2 | 90 | 68 |
| Yampa | 9 | 107 | 73 |
| White | 3 | 107 | 60 |
| Total Yampa & White | 11 | 105 | 68 |
| Little Snake | 7 | 103 | 71 |
| **Basin-Wide Total** | 25 | 104 | 77 |

*SWE values calculated using first of month SNOTEL data and snow course measurements




**Reservoir Storage End of December 2018**

| Reservoir | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|---|---|---|---|---|
| STAGECOACH RESERVOIR NR OAK C | 31.2 | 33.4 | 29.3 | 36.5 |
| YAMCOLO RESERVOIR | 2.5 | 7.1 | 5.3 | 8.7 |
| **BASINWIDE** | 33.7 | 40.5 | 34.6 | 45.2 |
| Number of Reservoirs | 2 | 2 | 2 | 2 |

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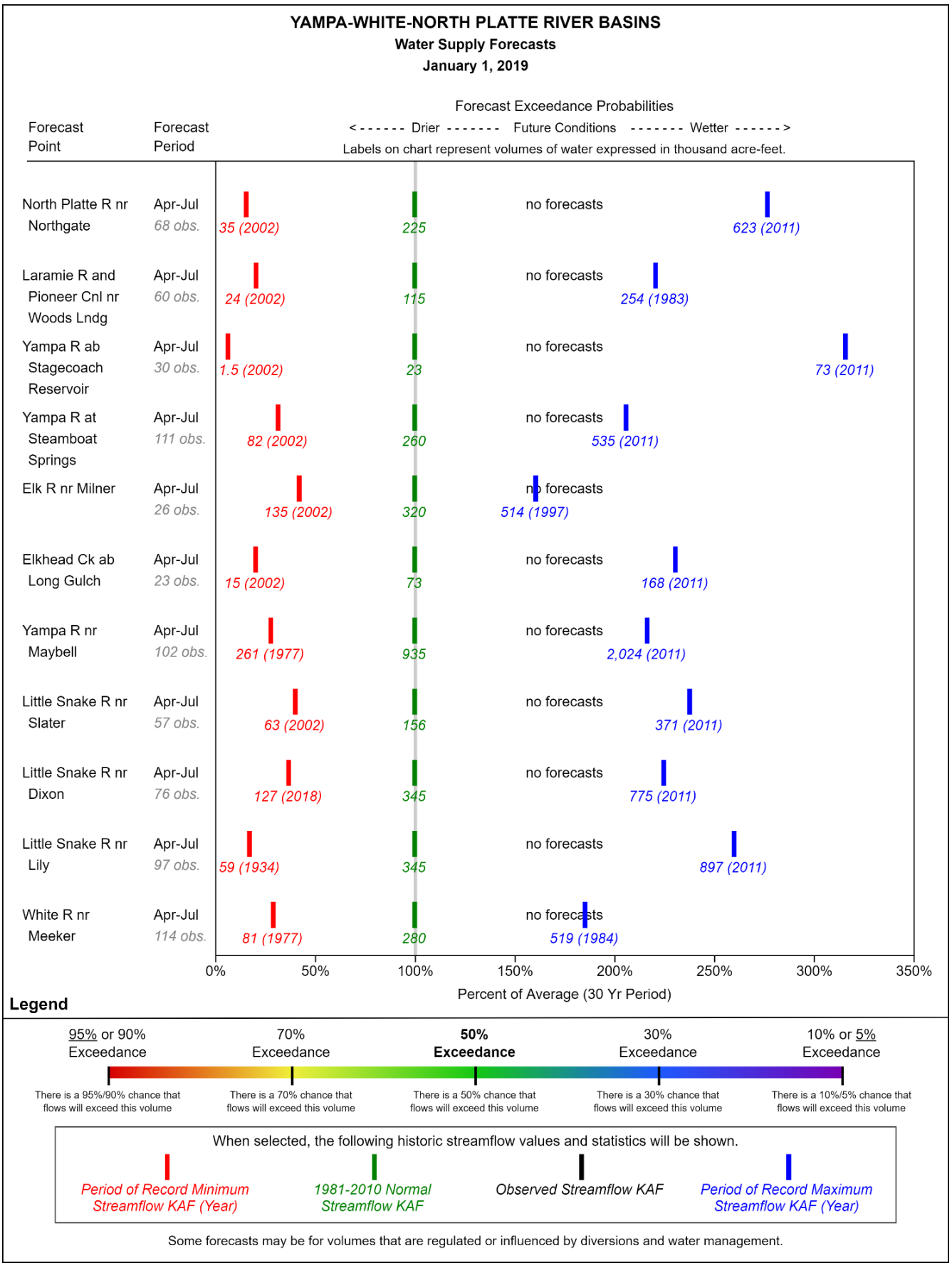
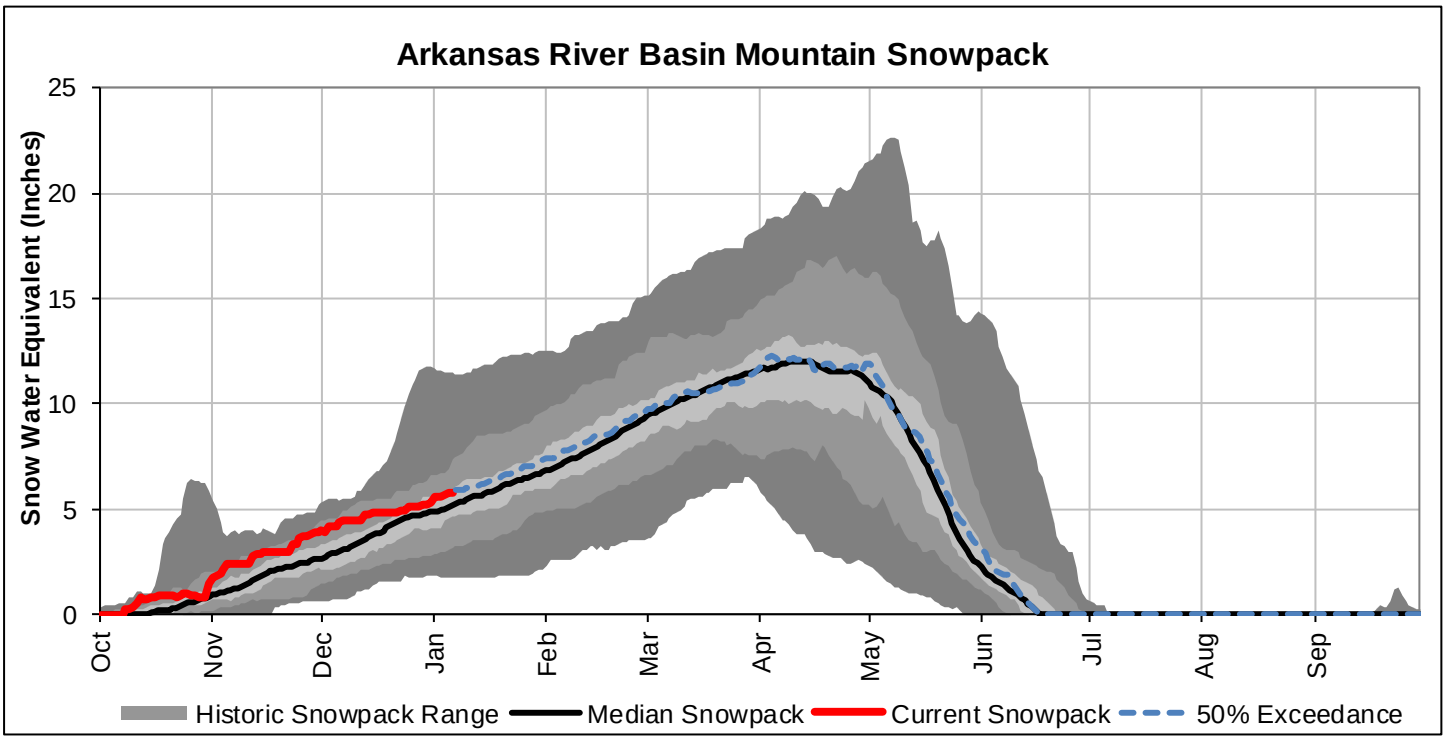


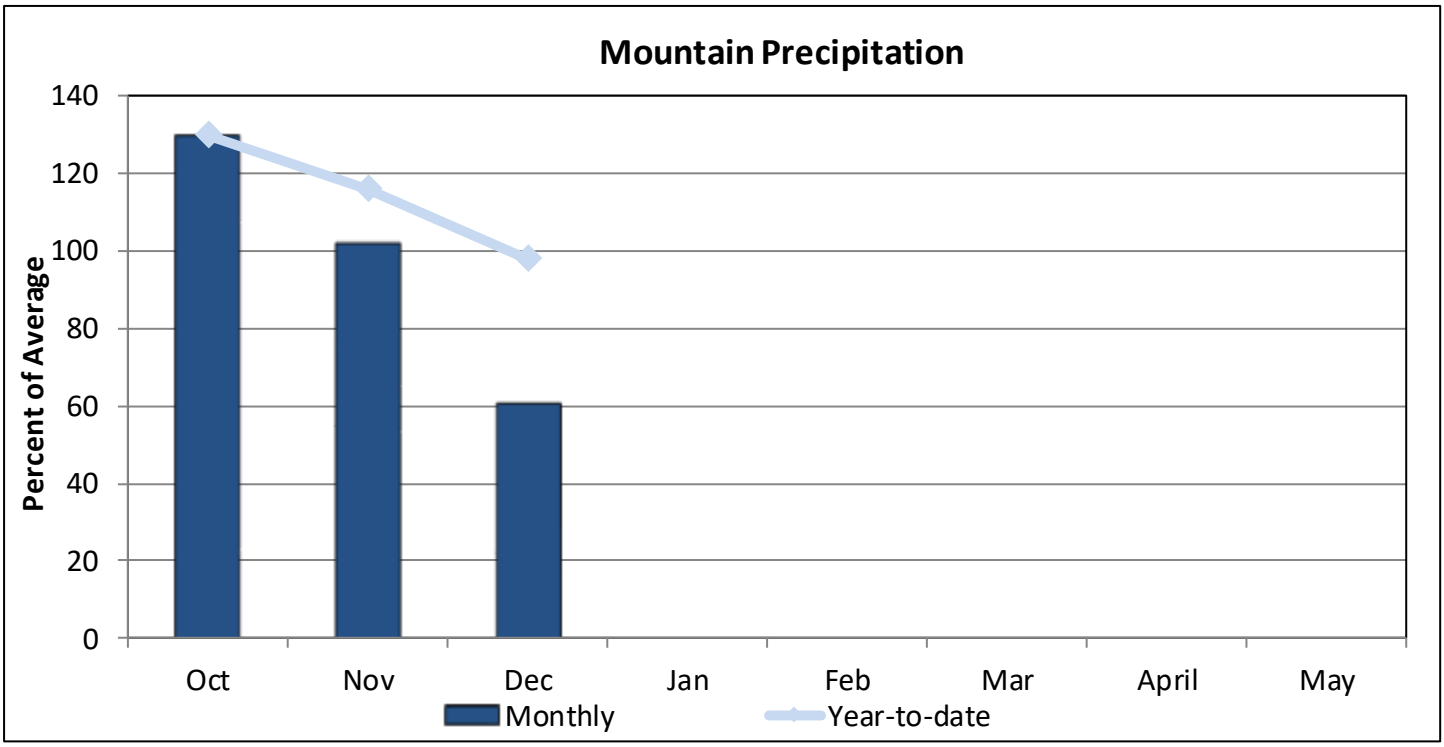
# ARKANSAS RIVER BASIN

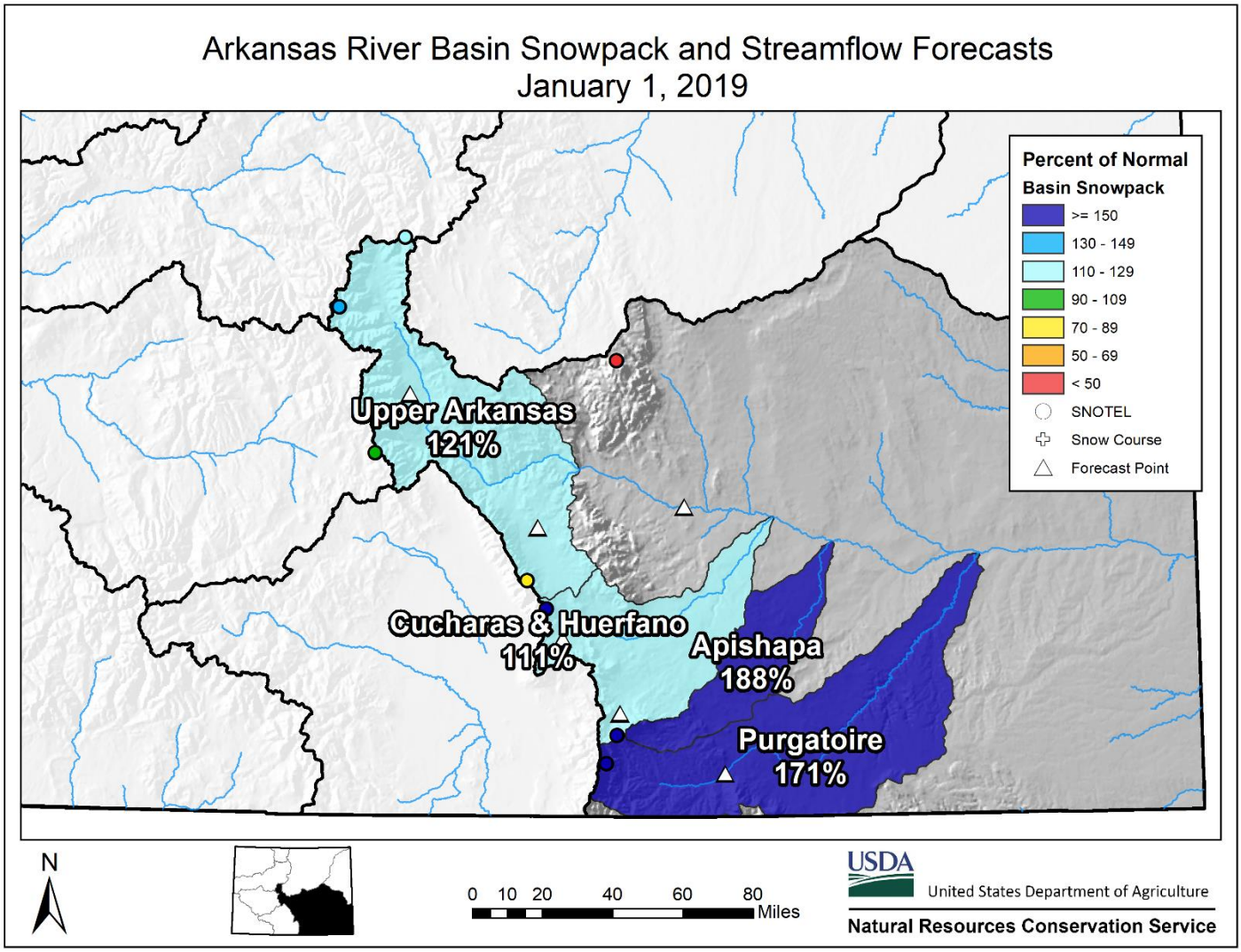
January 1, 2019

Snowpack in the Arkansas River basin is above normal at 116% of the median. Precipitation for December was 61% of average which brings water year-to-date precipitation to 98% of average. Reservoir storage at the end of December was 92% of average compared to 139% last year. No forecasts are available for January.




*SWE values calculated using daily SNOTEL data only

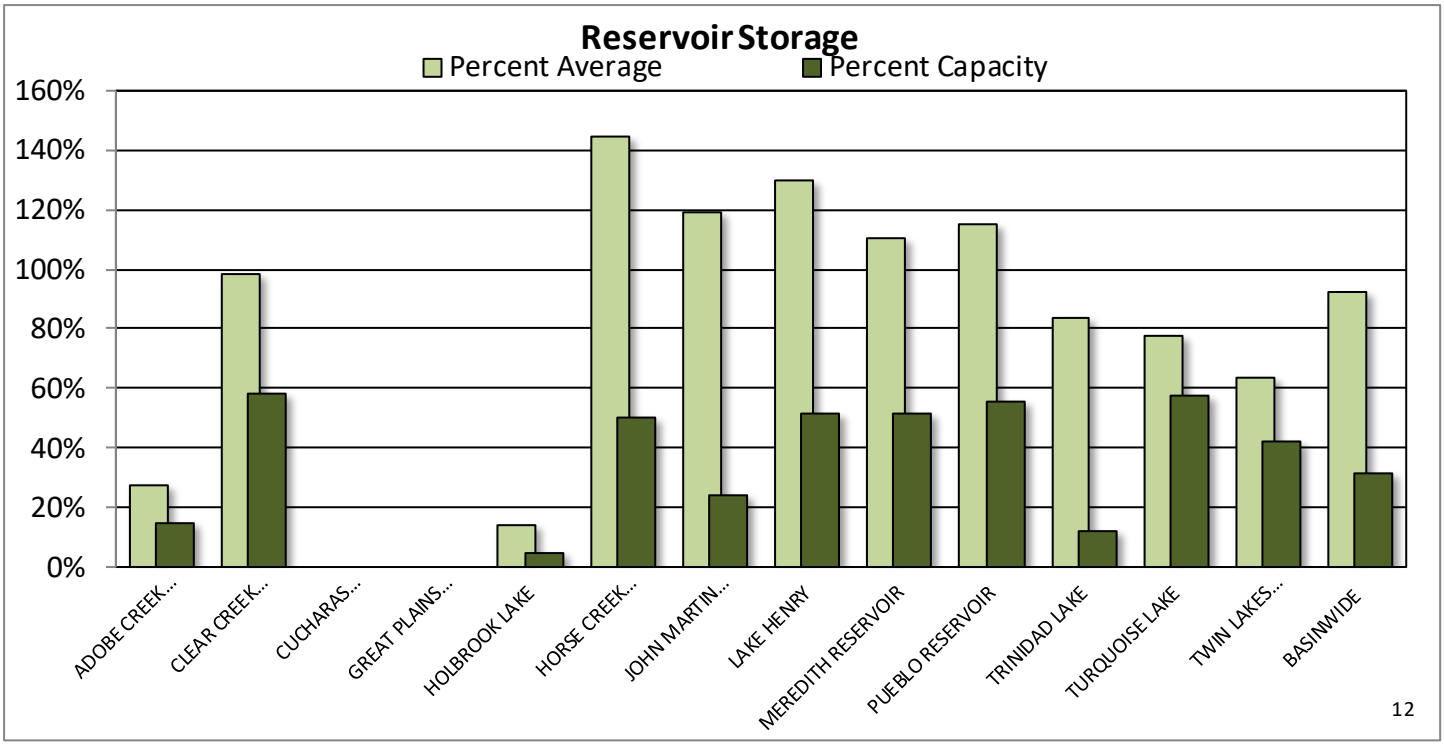





**Watershed Snowpack Analysis January 1st, 2019**

| Sub-Basin | # of Sites | % Median | Last Year % Median |
|---|---|---|---|
| Upper Arkansas | 3 | 121 | 81 |
| Cucharas & Huerfano | 3 | 111 | 17 |
| Purgatoire | 2 | 171 | 21 |
| **Basin-Wide Total** | 8 | 116 | 48 |

*SWE values calculated using first of month SNOTEL data and snow course measurements




**Reservoir Storage End of December 2018**

| Reservoir | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|---|---|---|---|---|
| ADOBE CREEK RESERVOIR | 9.0 | 47.7 | 32.7 | 62.0 |
| CLEAR CREEK RESERVOIR | 6.6 | 7.1 | 6.7 | 11.4 |
| CUCHARAS RESERVOIR | | | | 40.0 |
| GREAT PLAINS RESERVOIR | | | | 150.0 |
| HOLBROOK LAKE | 0.3 | 6.2 | 2.5 | 7.0 |
| HORSE CREEK RESERVOIR | 13.6 | 26.9 | 9.4 | 27.0 |
| JOHN MARTIN RESERVOIR | 146.2 | 268.9 | 122.8 | 616.0 |
| LAKE HENRY | 4.8 | 9.0 | 3.7 | 9.4 |
| MEREDITH RESERVOIR | 21.7 | 39.1 | 19.7 | 42.0 |
| PUEBLO RESERVOIR | 196.8 | 220.6 | 170.8 | 354.0 |
| TRINIDAD LAKE | 20.5 | 38.3 | 24.4 | 167.0 |
| TURQUOISE LAKE | 73.2 | 93.4 | 94.1 | 127.0 |
| TWIN LAKES RESERVOIR | 36.3 | 42.2 | 57.0 | 86.0 |
| **BASINWIDE** | 529.0 | 799.4 | 543.8 | 1698.8 |
| Number of Reservoirs | 11 | 11 | 11 | 13 |

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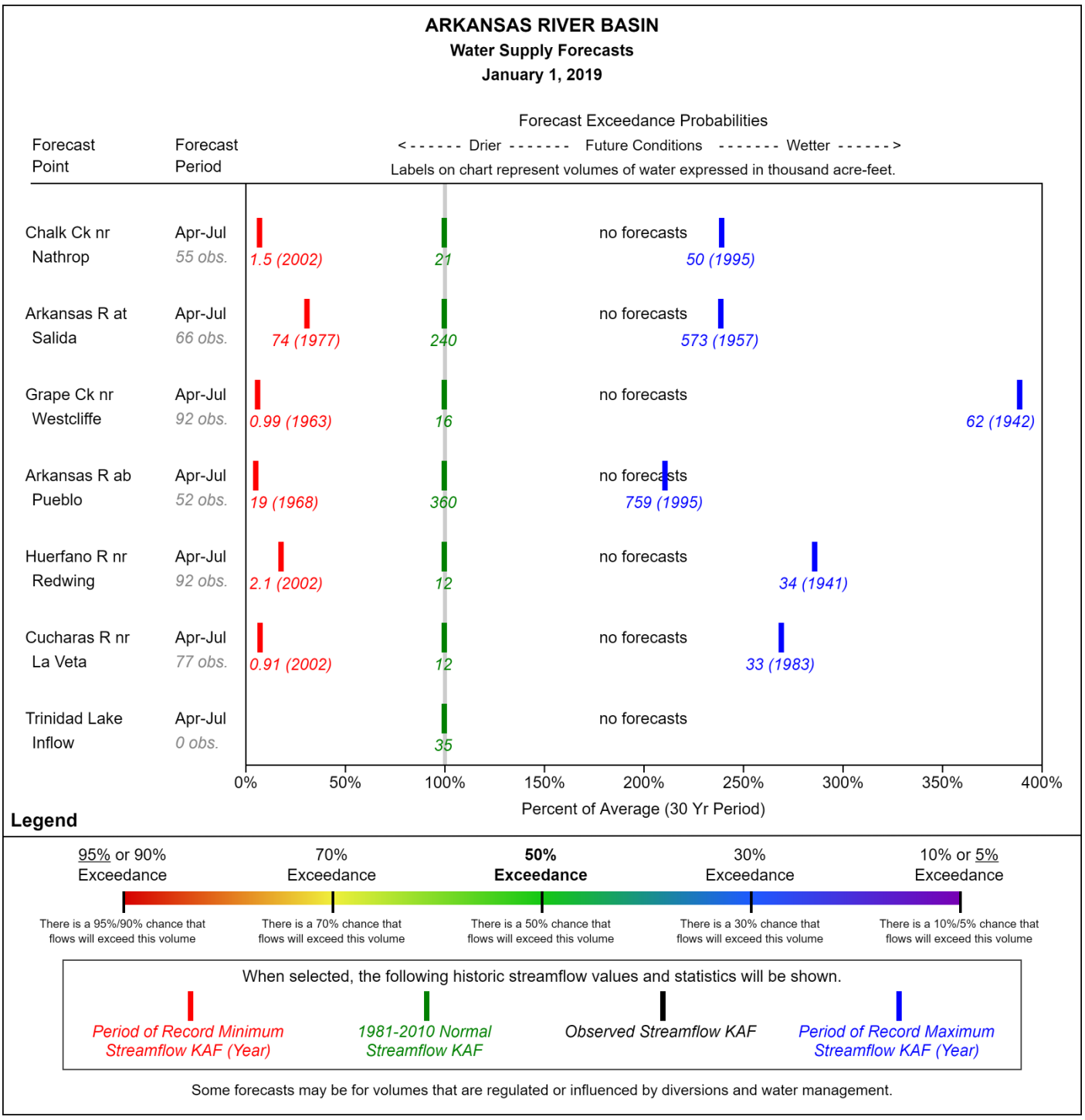
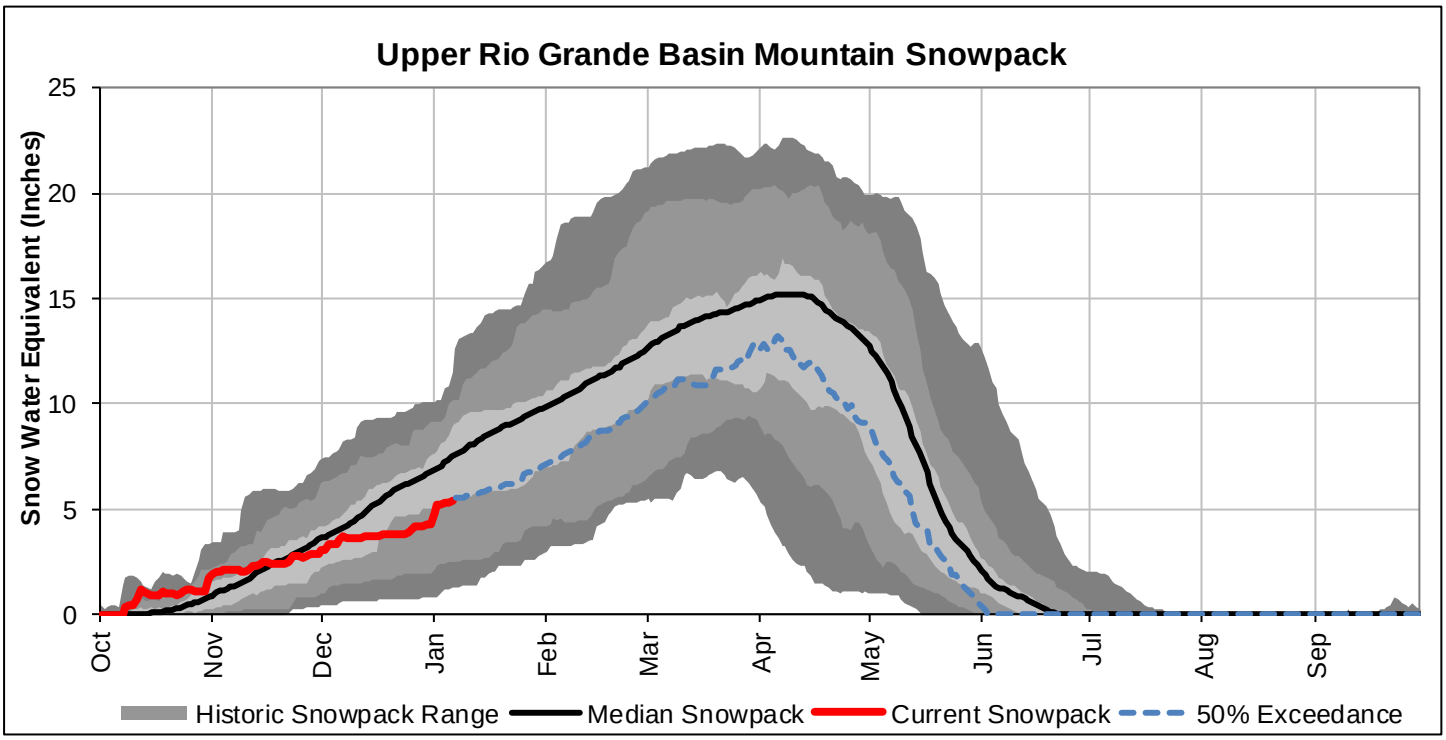


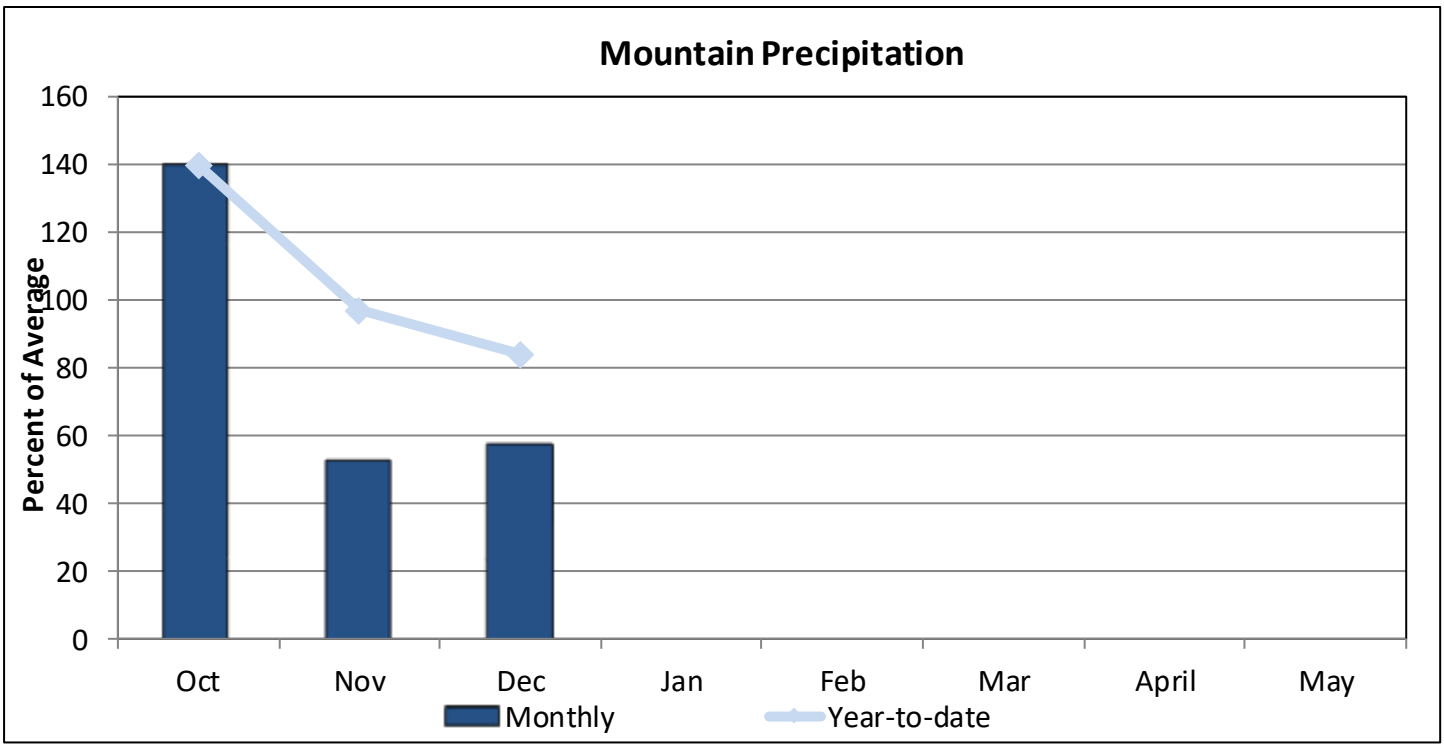
# UPPER RIO GRANDE RIVER BASIN

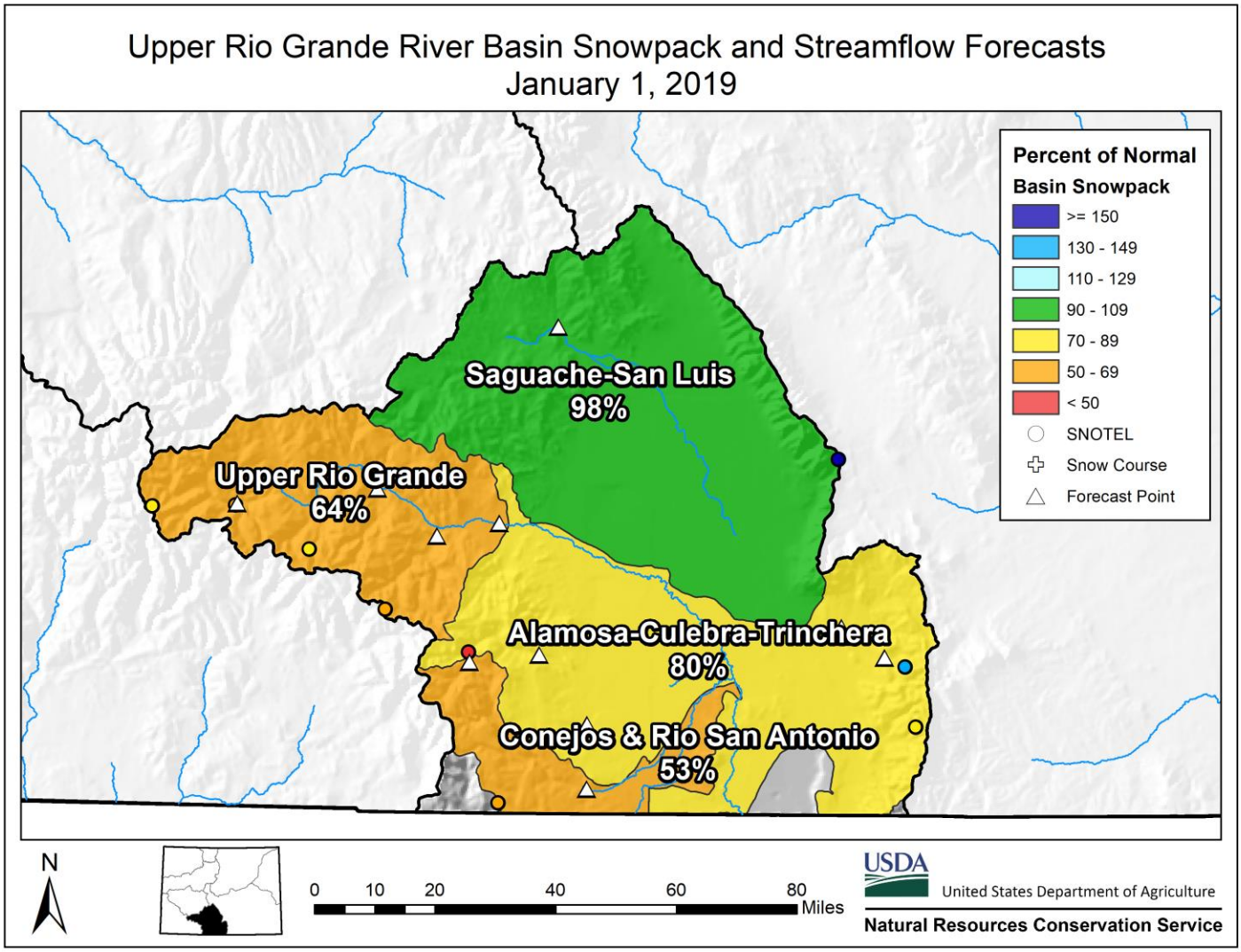
January 1, 2019

Snowpack in the Upper Rio Grande River basin is below normal at 70% of median. Precipitation for December was 58% of average which brings water year-to-date precipitation to 84% of average. Reservoir storage at the end of December was 80% of average compared to 123% last year. No forecasts are available for January.




*SWE values calculated using daily SNOTEL data only

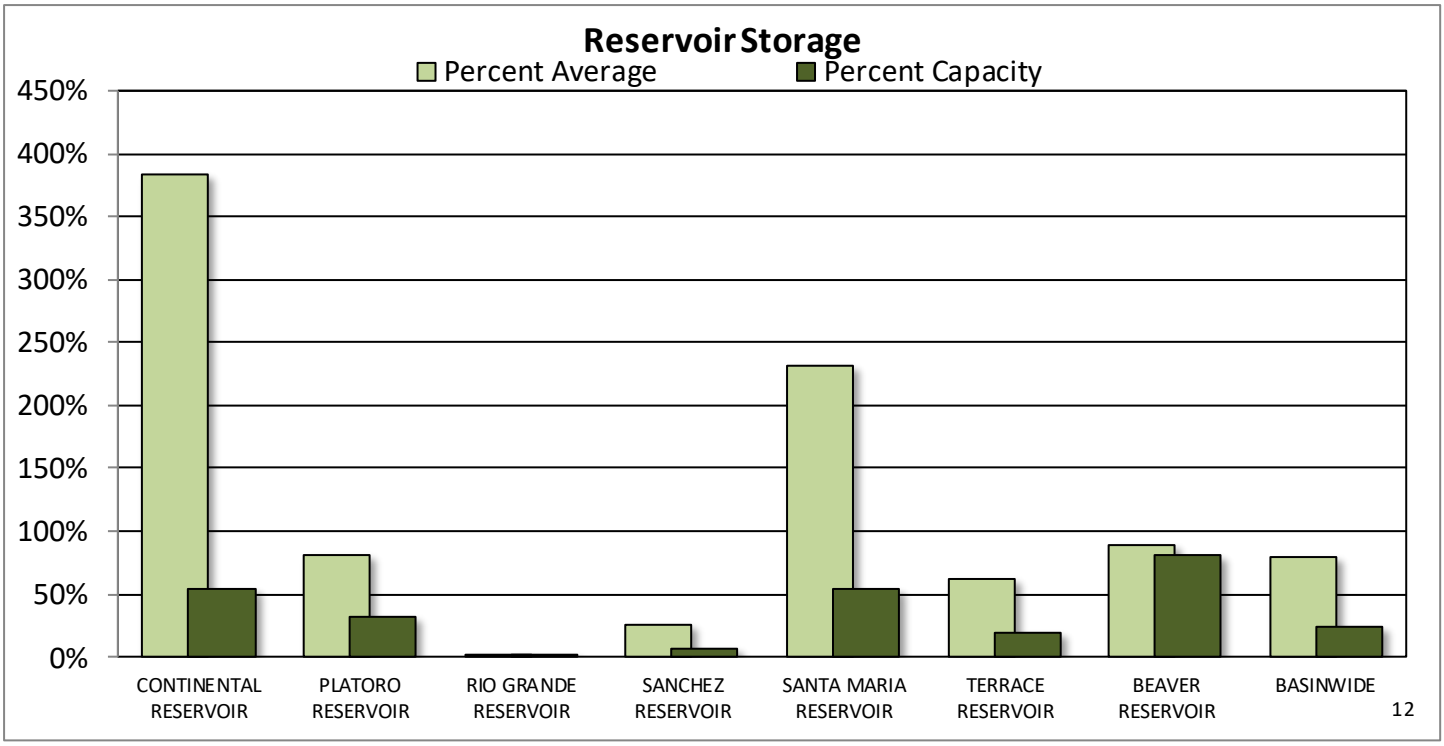





**Watershed Snowpack Analysis January 1st, 2019**

| Sub-Basin | # of Sites | % Median | Last Year % Median |
|---|---|---|---|
| Alamosa Creek | 1 | 44 | 52 |
| Conejos & Rio San Antonio | 2 | 53 | 42 |
| Culebra & Trinchera Creek | 3 | 95 | 26 |
| Upper Rio Grande | 6 | 64 | 26 |
| **Basin-Wide Total** | 12 | 70 | 29 |

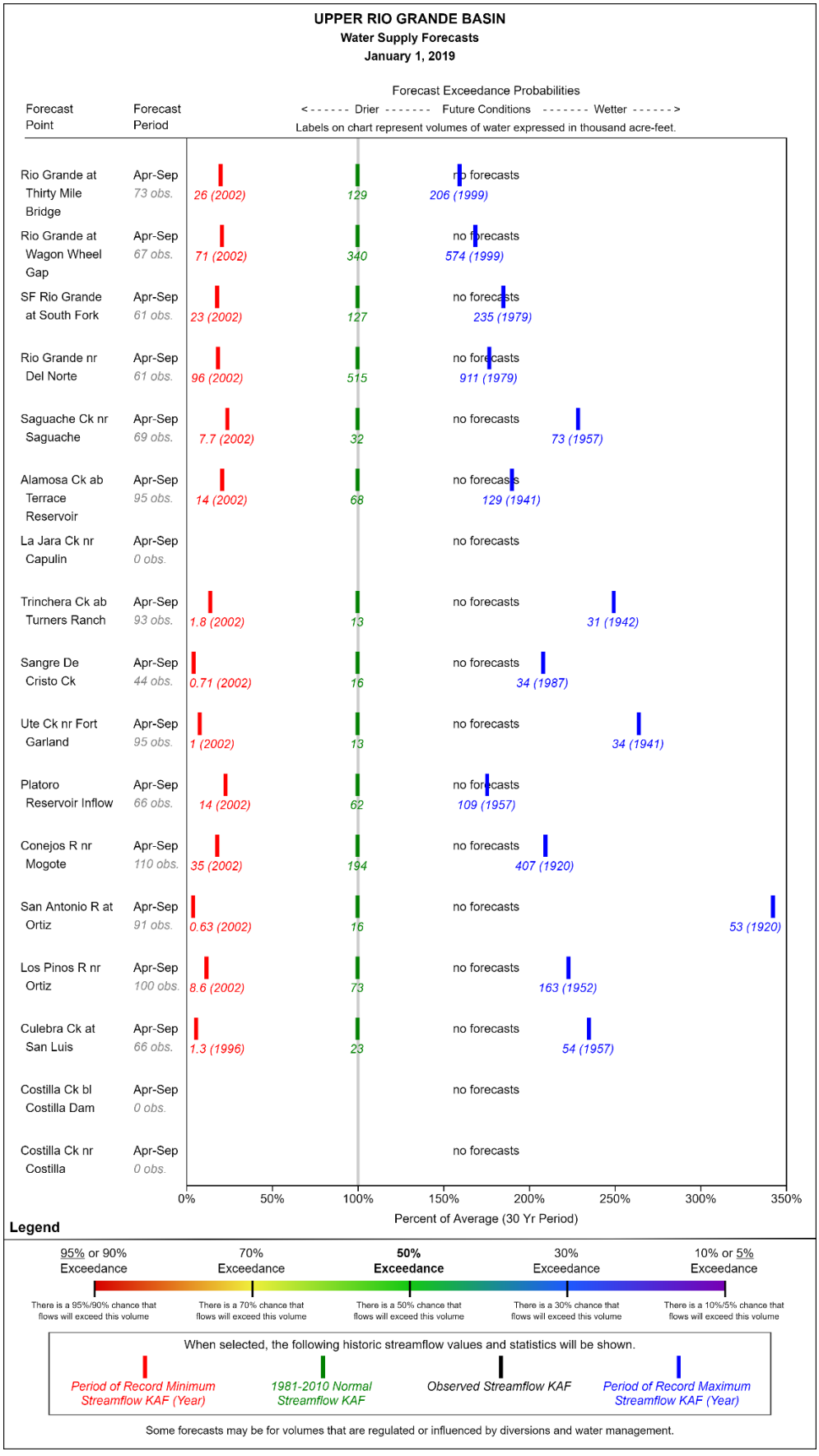
*SWE values calculated using first of month SNOTEL data and snow course measurements




**Reservoir Storage End of December 2018**

| Reservoir | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|---|---|---|---|---|
| CONTINENTAL RESERVOIR | 14.6 | 10.8 | 3.8 | 27.0 |
| PLATORO RESERVOIR | 19.3 | 23.3 | 24.0 | 60.0 |
| RIO GRANDE RESERVOIR | 0.0 | 25.8 | 14.8 | 51.0 |
| SANCHEZ RESERVOIR | 7.0 | 21.2 | 27.5 | 103.0 |
| SANTA MARIA RESERVOIR | 24.0 | 18.9 | 10.4 | 45.0 |
| TERRACE RESERVOIR | 3.4 | 7.5 | 5.5 | 18.0 |
| BEAVER RESERVOIR | 3.6 | 3.3 | 4.1 | 4.5 |
| **BASINWIDE** | 72.0 | 110.7 | 90.1 | 308.5 |
| Number of Reservoirs | 7 | 7 | 7 | 7 |

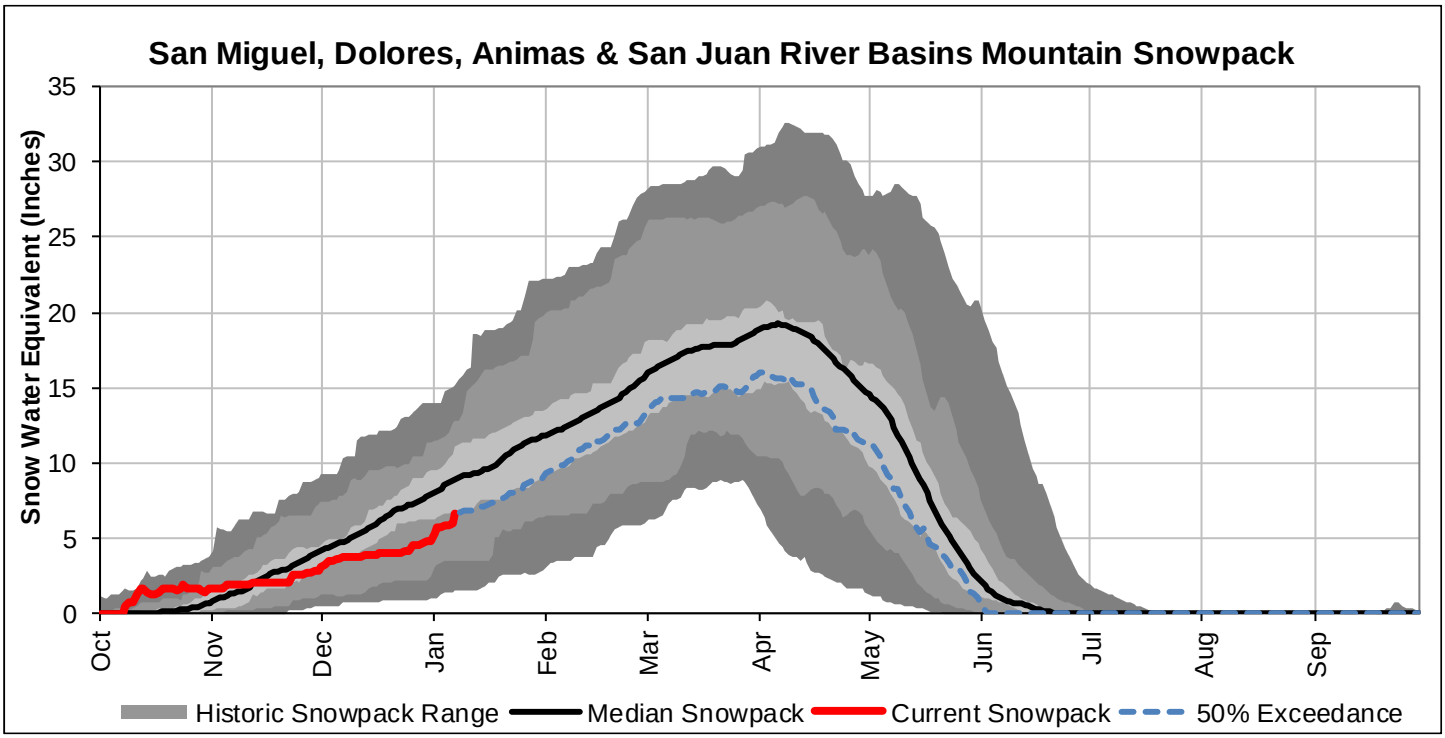
Due to current staffing, most official forecasts only will be available February through May. If you rely on the January or June forecasts, please contact cara.s.mccarthy@por.usda.gov or Brian.Domonkos@co.usda.gov. The following displays the historic range of observed streamflows for reference during months where forecasts are not available.



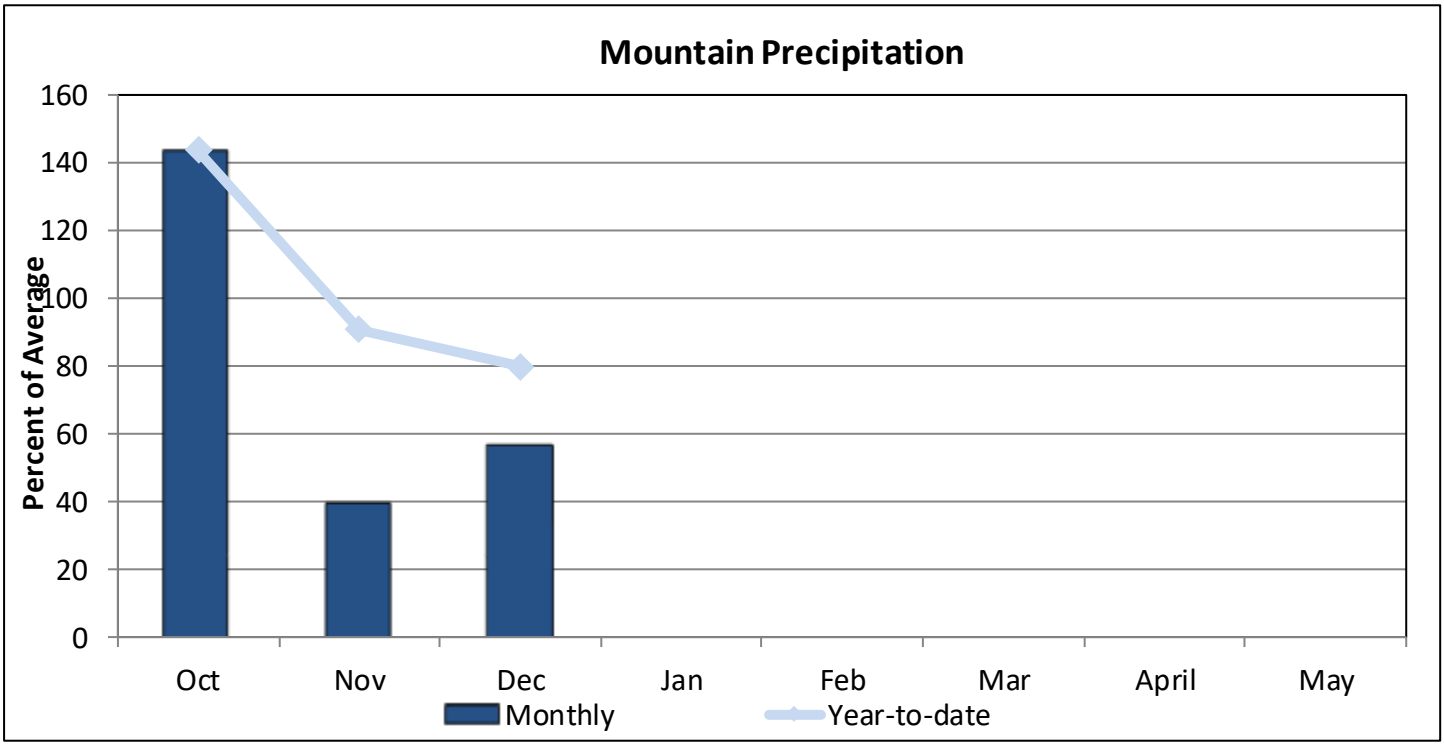
# SAN MIGUEL, DOLORES, ANIMAS, AND SAN JUAN RIVER BASINS

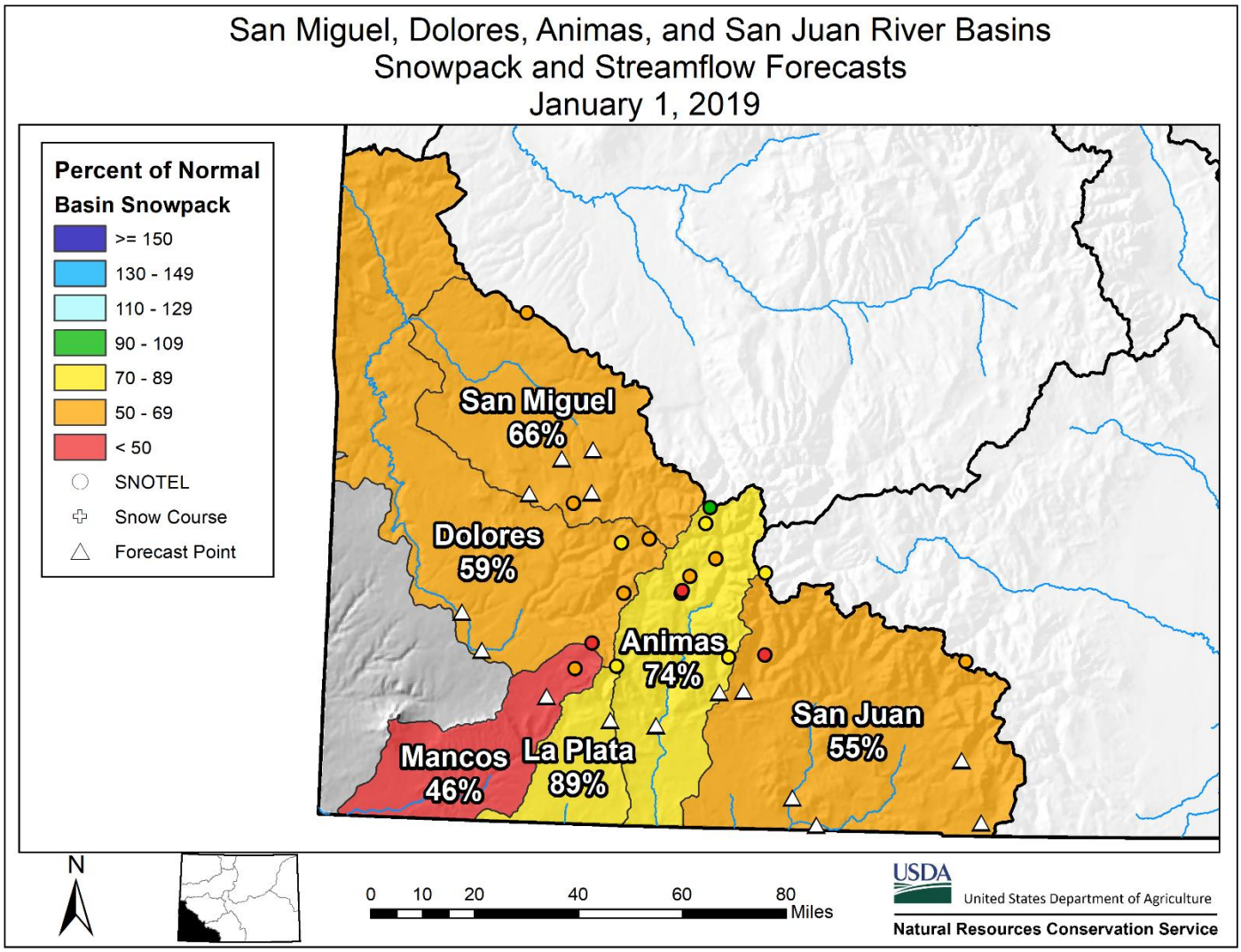
January 1, 2019

Snowpack in the combined southwest river basins is below normal at 66% of median. Precipitation for December was 57% of average which brings water year-to-date precipitation to 80% of average. Reservoir storage at the end of December was 56% of average compared to 105% last year. No forecasts are available for January.




*SWE values calculated using daily SNOTEL data only

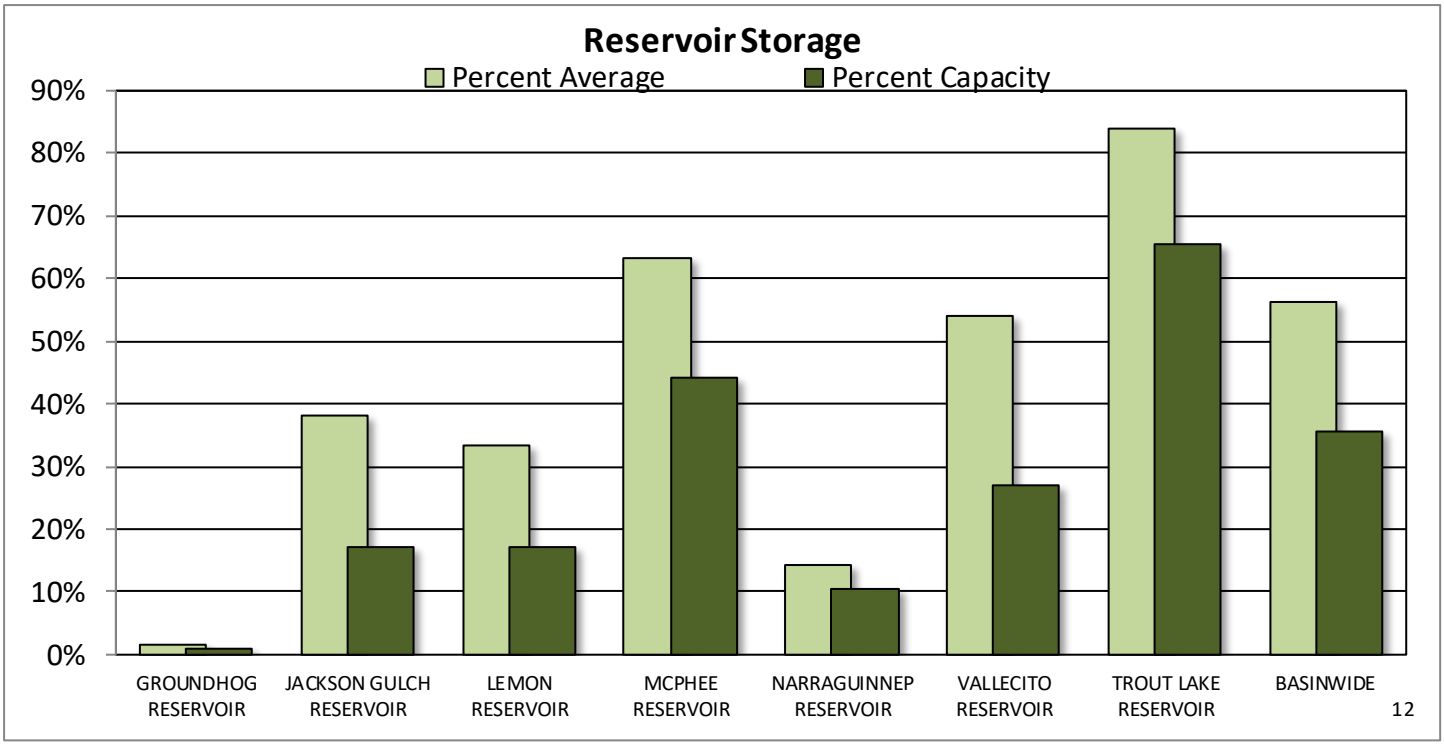





**Watershed Snowpack Analysis January 1st, 2019**

| Sub-Basin | # of Sites | % Median | Last Year % Median |
|---|---|---|---|
| Animas | 9 | 74 | 24 |
| Dolores | 5 | 59 | 19 |
| San Miguel | 3 | 66 | 18 |
| San Juan | 3 | 55 | 25 |
| **Basin-Wide Total** | 19 | 66 | 22 |

*SWE values calculated using first of month SNOTEL data and snow course measurements






**Reservoir Storage End of December 2018**

| Reservoir | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|---|---|---|---|---|
| GROUNDHOG RESERVOIR | 0.2 | 12.1 | 12.3 | 22.0 |
| JACKSON GULCH RESERVOIR | 1.7 | 5.2 | 4.5 | 10.0 |
| LEMON RESERVOIR | 6.9 | 18.7 | 20.7 | 40.0 |
| MCPHEE RESERVOIR | 168.0 | 285.5 | 265.6 | 381.0 |
| NARRAGUINNEP RESERVOIR | 2.0 | 11.7 | 14.1 | 19.0 |
| VALLECITO RESERVOIR | 33.8 | 64.9 | 62.4 | 126.0 |
| TROUT LAKE RESERVOIR | 2.1 | 2.6 | 2.5 | 3.2 |
| **BASINWIDE** | 214.7 | 400.8 | 382.1 | 601.2 |
| Number of Reservoirs | 7 | 7 | 7 | 7 |

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# How to Read Snowpack Graphs

The graphs show snow water equivalent (SWE) (in inches), using daily SNOTEL data. for the October 1 through September 30 water year. Basin "observed" SWE values are computed using SNOTEL sites which are characteristic of the snowpack of the particular basin. The SWE observations at these sites are averaged and normalized to produce these basin snowpack graphs.

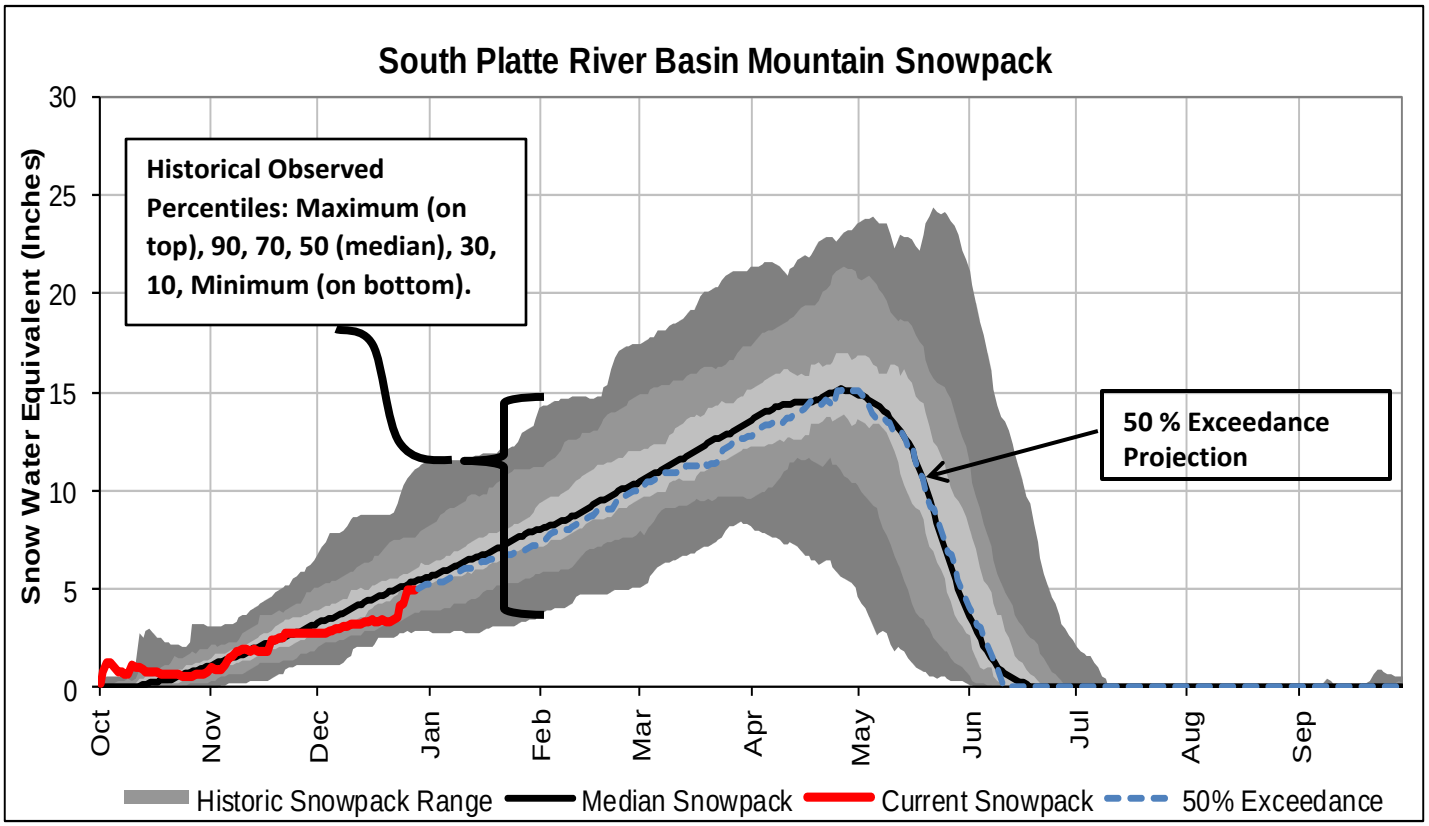
**Current** water year is represented by the heavy red line terminating on the last day the graphic was updated.

**Historical** observed percentile range is shown as a gray background area on the graph. Shades of gray indicate maximum, 90 percentile, 70 percentile, 50 percentile (solid black line), 30 percentile, 10 percentile, and minimum for the period of record.

**50 % Excedance Projection**: The most probabilistic snowpack projection, based on the median snowpack is projected forward from the end of the current period to the end of the current water year.

For more detailed information on these graphs visit:

http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_062291.pdf



# How Forecasts Are Made

*For more water supply and resource management information, contact:*

**Brian Domonkos**
**Snow Survey Supervisor**
**USDA, Natural Resources Conservation Service**
**Denver Federal Center, Bldg 56, Rm 2604**
**PO Box 25426**
**Denver, CO 80225-0426**
**Phone (720) 544-2852**
**Website: http://www.nrcs.usda.gov/wps/portal/nrcs/main/co/snow/**

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Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to prepare runoff forecasts. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less wate

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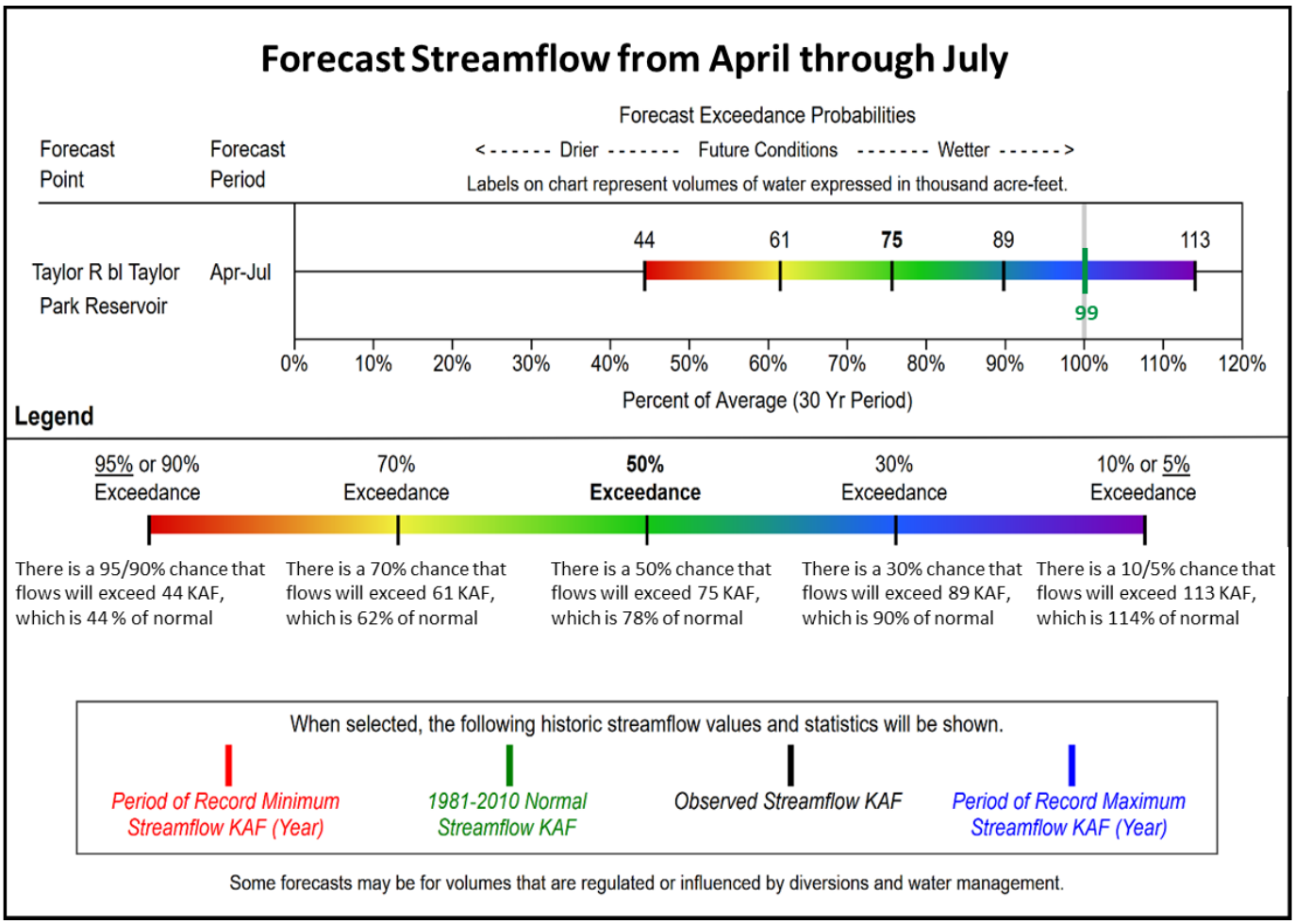
# Interpreting the Forecast Graphics

These graphics provide a new way to visualize the range of streamflows represented by the forecast exceedance probabilities for each forecast period. The colors in the bar for each forecast point indicate the exceedance probability of the forecasts and the vertical lines on the bar signify the five published forecast exceedance probabilities. The numbers displayed above the color scale represent the actual forecasted streamflow volume (in KAF) for the given exceedance probability. The horizontal axis provides the percent of average represented by each forecast and the gray line centered above 100% represents the 1981-2010 historical average streamflow. The position of the gray line relative to the color scale provides a benchmark for considering future streamflows. If the majority of the forecast range is to the right of the gray line, there is a higher likelihood of above average streamflow volumes during the provided forecast period. Conversely, if the majority of the color bar is to the left of the average mark, below average volumes are more likely. The horizontal span of the forecasts offers an indication of the uncertainty in a given forecast: when the bar spans a large horizontal range, the forecast skill is low and uncertainty is high; when the bar is narrow in width, the forecast skill is higher and uncertainty lower.



Denver Federal Center, Bldg 56, Rm 2604
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Denver, CO 80225-0426

In addition to the water supply outlook reports, water supply forecast information for the Western United States is available from the Natural Resources Conservation Service and the National Weather Service monthly, January through June. The information may be obtained from the Natural Resources Conservation Service web page at http://www.wcc.nrcs.usda.gov/wsf/westwide.html

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**Natural Resources Conservation Service**
**Lakewood, Colorado**

# Colorado
# Water Supply Outlook Report
**Natural Resources Conservation Service**
**Lakewood, CO**